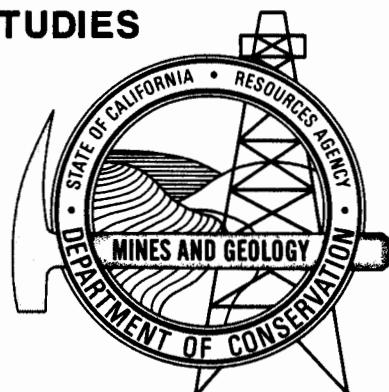


**PROCESSED DATA FROM THE
STRONG-MOTION RECORD OBTAINED AT
A BASE-ISOLATED BUILDING IN
RANCHO CUCAMONGA, CALIFORNIA
DURING THE REDLANDS EARTHQUAKE
OF 2 OCTOBER 1985**

**CALIFORNIA DEPARTMENT OF CONSERVATION
DIVISION OF MINES AND GEOLOGY
OFFICE OF STRONG MOTION STUDIES**

REPORT OSMS 86-01



STATE OF CALIFORNIA
GEORGE DEUKMEJIAN
Governor

THE RESOURCES AGENCY
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Secretary for Resources

DEPARTMENT OF CONSERVATION
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DIVISION OF MINES AND GEOLOGY

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State Geologist

PROCESSED DATA FROM THE STRONG-MOTION RECORD OBTAINED AT
A BASE-ISOLATED BUILDING IN RANCHO CUCAMONGA, CALIFORNIA
DURING THE REDLANDS EARTHQUAKE OF 2 OCTOBER 1985

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Report No. OSMS 86-01

California Strong Motion Instrumentation Program

California Department of Conservation

Division of Mines and Geology

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March 1986

CONTENTS

	Page
Introduction	1
Earthquake Characteristics	1
Rancho Cucamonga Law & Justice Building	1
Strong Motion Instrumentation	3
Recorded Motion	5
Accelerogram Digitization and Processing	5
Digitization Noise Level	11
Acknowledgments	14
References	15
Data Availability	16
Appendix - Plots of Processed Data	17
List of CSMIP Reports and Data Tapes	67

INTRODUCTION

Strong-motion records were recovered from 13 stations instrumented by the California Strong Motion Instrumentation Program (CSMIP) following the Redlands earthquake of October 2, 1985. The records obtained were of low amplitude. A record of particular interest was obtained at the San Bernardino County Law and Justice Center in Rancho Cucamonga, which is a base-isolated building. This report presents results of the digitization and processing performed on the record from this building, located about 30 kilometers from the earthquake epicenter. The unprocessed accelerograms from several other stations for this earthquake are shown in the data report OSMS 85-02 (1985).

EARTHQUAKE CHARACTERISTICS

The Redlands earthquake occurred on October 2, 1985 near Redlands, California. The earthquake was widely felt in San Bernardino and Riverside counties. Preliminary earthquake parameters determined by the California Institute of Technology are:

Origin Time: 23:44:15 GMT, 2 October 1985 (16:44:15 PDT)
Epicenter: 34.03 N, 117.25 W
Focal Depth: 15 km, approximate
Magnitude: 4.8 ML

RANCHO CUCAMONGA LAW AND JUSTICE BUILDING

The Rancho Cucamonga Law and Justice Center (Fig. 1a) has 4 stories and a full basement. The structure is approximately 414 by 110 feet in plan and 74 feet from the basement to the roof. The lateral force-resisting system consists of braced steel frames in the upper four stories and concrete shear walls at the basement. The structure is isolated on elastomeric bearings placed on the

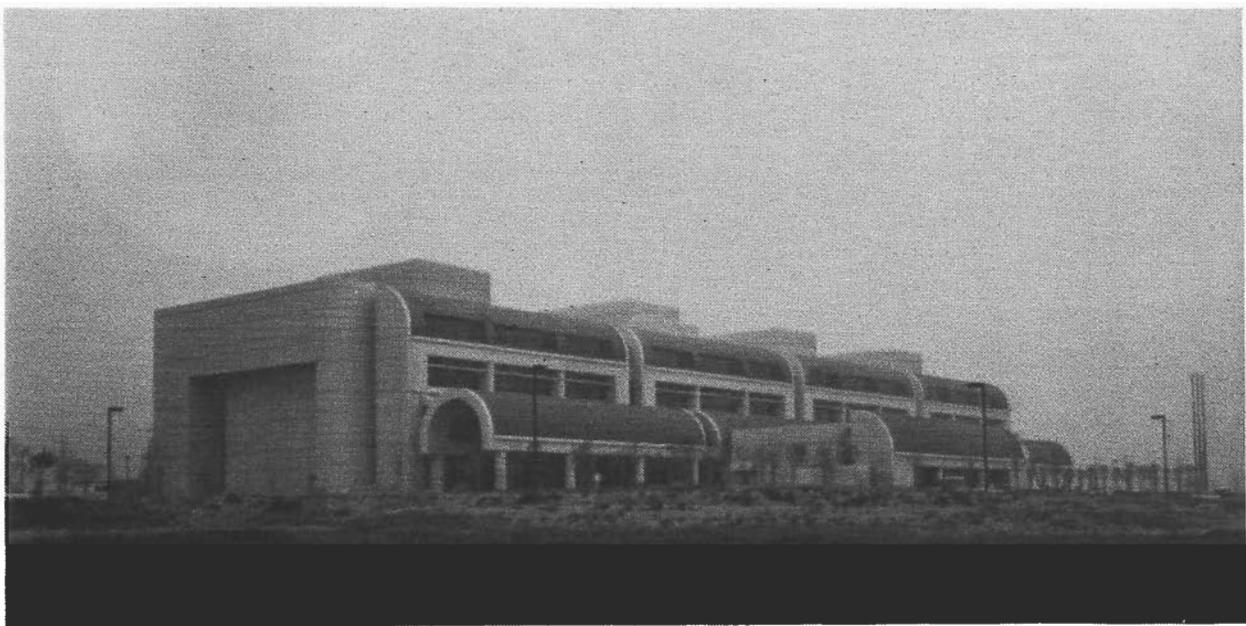


Fig. 1a Rancho Cucamonga Law and Justice Center viewed from the southwest.



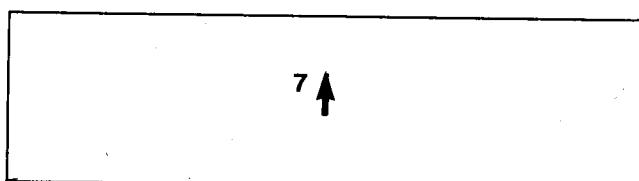
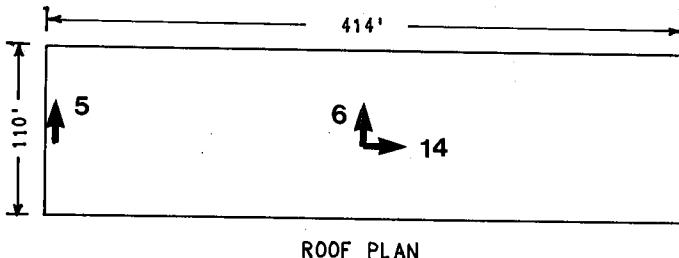
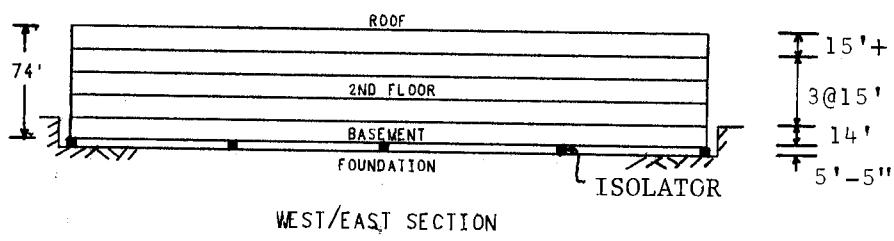
Fig. 1b Rancho Cucamonga Law and Justice Center viewed from the southeast, showing the free-field acceleration sensors (instrument cover removed) in the foreground.

foundation under each of the 98 columns. More detailed information on the base isolation system in this building is given by Tarics et al. (1984).

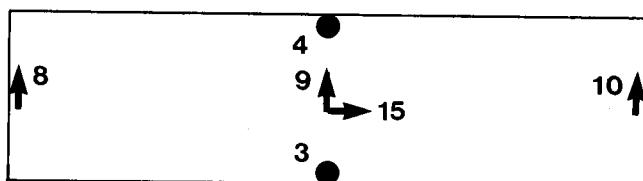
STRONG MOTION INSTRUMENTATION

The Law and Justice building, instrumented by the California Strong Motion Instrumentation Program, has a total of 19 force balance accelerometers installed at various locations. The locations of the accelerometers are shown schematically in Fig. 2. Sensors 1 through 4 are mounted vertically to record vertical motions at the basement level (above the isolators) and at the foundation level (below the isolators). Located on each edge of the building, the pairs allow determination of any overturning motion in the transverse direction. Sensors 5 through 13 record the translational motion in the transverse direction at the roof, 2nd floor, basement and foundation. These sensors allow determination of the torsional or rotational motion of the structure at these levels. Sensors 14 through 16 record the translational motion in the longitudinal direction. Sensors 17 through 19 are a triaxial set deployed about 330 feet from the building to record free-field ground motion (Fig. 1b).

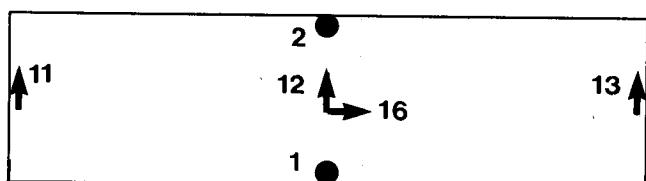
The sensors installed at the building are interconnected to two centrally-located recorders. Sensors 1 to 13 are connected to one recorder and 14 to 19 are connected to the second recorder. Each recorder has a 7-inch wide film on which the signals from the associated sensors are recorded with a common time base. The two recorders are interconnected in order to begin recording simultaneously (within 0.1 second, nominal).



2ND FLOOR PLAN



BASEMENT PLAN



FOUNDATION PLAN

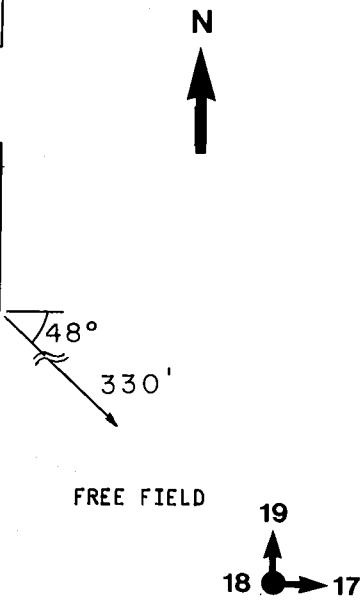


Fig. 2. Locations of acceleration sensors in the Rancho Cucamonga Law and Justice building. Arrows show the location and positive direction of the accelerometers. Dots indicate positive direction out of the plane of the figure.

RECORDED MOTION

The accelerograms recorded at the Law and Justice building during the Redlands earthquake are shown in the report OSMS 85-02 (1985). These records were digitized and processed although they are of low amplitude. The digitization and processing procedures used at CSMIP are discussed in the next section.

The accelerations in the transverse direction from the sensors located at the center of the building are shown with a sectional view of the structure in Fig. 3. The acceleration records obtained from all 19 sensors are plotted in Fig. 4. The displacements integrated from the accelerations are shown in Fig. 5.

ACCELEROGram DIGITIZATION AND PROCESSING

The digitization results presented in this report were obtained using a computer-driven optical scanning system. This facility is patterned after the system developed at the University of Southern California (Trifunac and Lee, 1979; Lee and Trifunac, 1979). In these systems, a direct photographic negative copy of the film accelerogram is mounted on a rotating drum which is scanned by a photodensitometer. The photodensitometer is mounted on a carriage moving perpendicular to the rotational direction. The resulting x-y array of optical density values is converted to raw time series through several trace-reconstruction steps. Baseline and other corrections are then applied to this raw data to obtain acceleration data for further processing and spectral analysis. The subsequent post-digitization processing is similar to that first developed at the California Institute of Technology (Trifunac and Lee, 1973). To

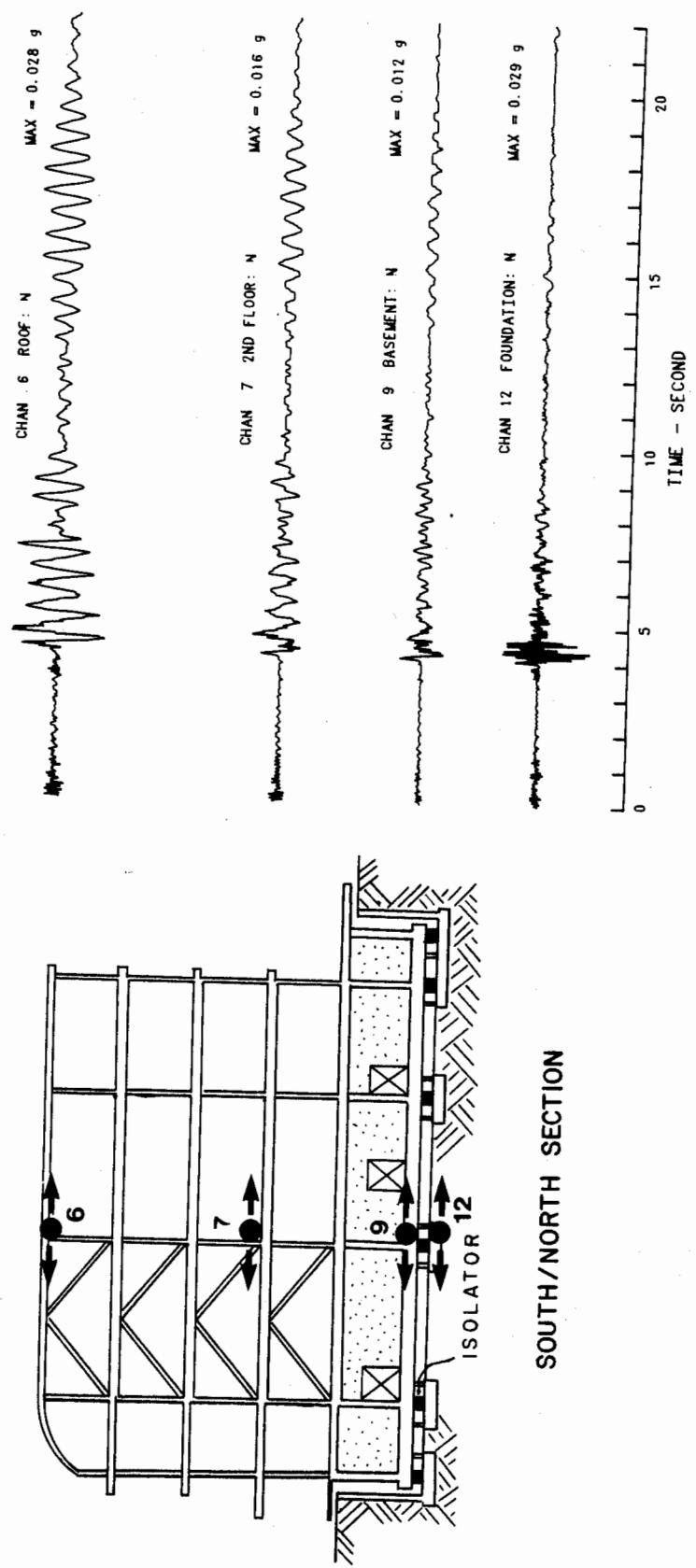


Fig. 3. Cross-section of the Rancho Cucamonga Law and Justice building and accelerograms obtained at the roof, 2nd floor, basement (above the isolators) and foundation (below the isolators) during the Redlands earthquake of October 2, 1985.

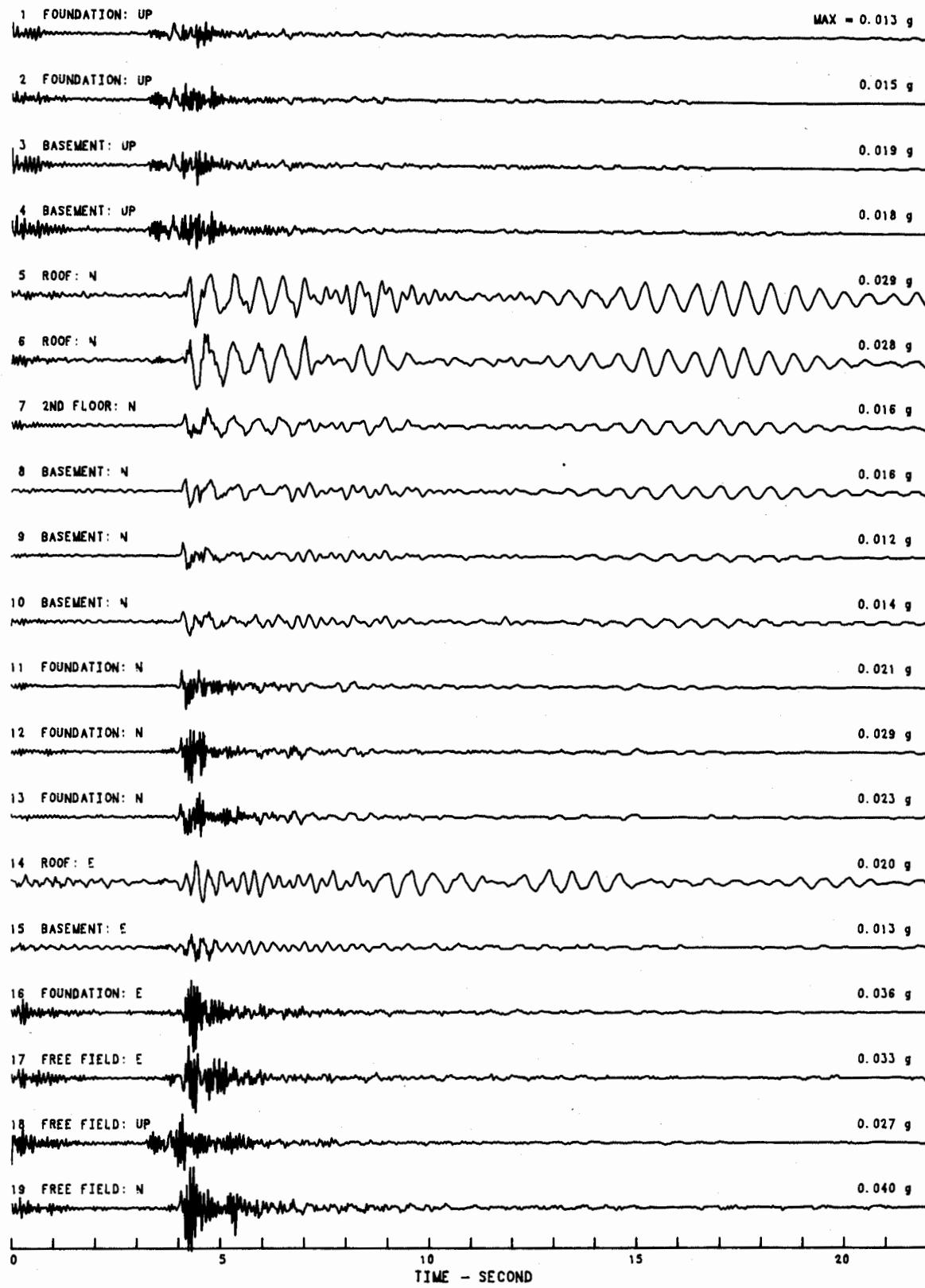


Fig. 4. Acceleration records obtained at the Rancho Cucamonga Law and Justice building during the Redlands earthquake of October 2, 1985.

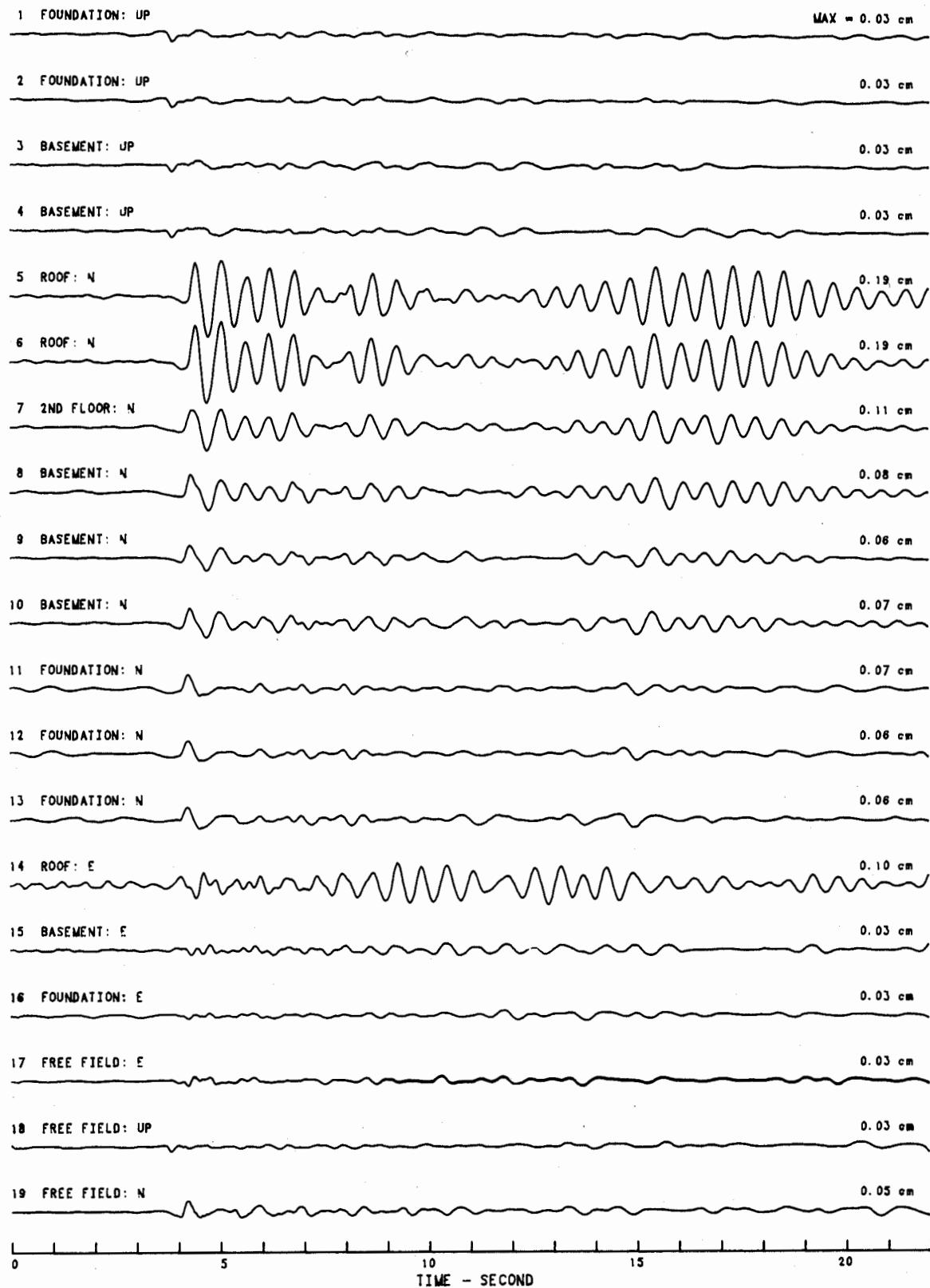


Fig. 5. Displacements computed from the acceleration records in Fig. 3. In processing these records a filter was applied to remove motions of period longer than 1.25 sec (predominantly digitization noise) from each trace.

improve the instrument correction procedure at high frequencies a change of operators was made as discussed in Shakal and Ragsdale (1984). Shakal and Ragsdale (1984) also give the results of noise floor analyses which guide the selection of filter corner frequencies in CSMIP processing.

The accelerograms obtained at the Law & Justice Building were recorded on the 7-inch wide films in two central recorders. The first recorder has 13 channels, and the second one has 6 channels. For each recorder, the 7-inch film contains acceleration traces, straight-line reference traces, and timing-pulse traces.

The sequence of steps in processing these records is summarized in the following:

1. The film record is contact-copied onto a film negative which is approximately 22 cm (22 seconds) in length.
2. The film negative is digitized into x and y coordinates by the optical scanner. The scanner sampling rate used for this record is 200 samples per centimeter in x and y. This is nominally equal to a time step of 0.005 second (200 samples/sec) and an acceleration increment of 0.003 g.
3. Vol. I Processing. The digitized reference traces are subtracted from the acceleration traces to remove any spurious film-movement effects. The axis of zero acceleration is determined. The digitized half-second time-mark traces are used to obtain an accurate time scale. The starting times of the acceleration channels are adjusted so any time phasing error from one channel to another is less than 0.02 sec (i.e., less than one time increment in the Vol. II data). The instrument sensitivities are used to scale ordinate values to accelerations.

4. Vol. II Processing. The Vol. I acceleration data are interpolated to obtain exactly 200 pts/sec sampling (100 Hz Nyquist frequency). The instrumental data are corrected to true acceleration using a simple finite-difference based instrument correction operator. A high-frequency Ormsby filter with a corner frequency of 23 Hz and a roll-off termination frequency of 25 Hz is applied. The data are then decimated to 50 pts/sec (25 Hz Nyquist). As discussed in Shakal and Ragsdale (1984), this order (instrument correction prior decimation) improves the accuracy of the instrument correction procedure at high frequencies while still using the same simple operator used in the original Caltech code (Trifunac and Lee, 1973). The acceleration data are corrected for long-period errors by using a low-frequency Ormsby filter with a ramp from 0.05 to 0.07 Hz. Velocity and displacement are integrated from acceleration and filtered using the same low-frequency Ormsby filter as for the acceleration. To prevent the introduction of spurious long-period energy through aliasing, an Ormsby filter rather than a running mean filter is used prior to the decimation associated with the long period filtering (Shakal, 1982; Shakal and Ragsdale, 1984).

5. Vol. III Processing. The response spectra for periods from 0.04 to 15 seconds and damping values of 0, 2, 5, 10 and 20 per cent of critical are calculated from the accelerations obtained in Step 4. The Fourier amplitude spectral values are also computed for these periods.

6. The Vol. II Processing of Step 4 is repeated, but with a new low-frequency Ormsby filter to remove long-period noise in the record. The corner frequency of the filter used depends on the signal-to-noise ratio in the record and the noise level of the

digitizing system. The long-period intersection of the PSV spectrum obtained in Step 5 and the CSMIP system average noise spectrum shown in Fig. 6 (from Shakal and Ragsdale, 1984) indicates the long-period limit of useful information. An iterative procedure is used, with the filter corner being set at progressively shorter periods in order to remove the long period noise while preserving as much of the signal as possible. The final long-period filter used for the Rancho Cucamonga record has a corner frequency of 0.8 Hz and a roll-off termination frequency of 0.4 Hz. The acceleration, velocity and displacement time histories obtained using this filter are the Vol. II data written on magnetic tape and presented in this report.

7. The Vol. III Processing of Step 5 is repeated, but the response spectra are computed for periods from 0.04 second to the period near the final long-period filter used in Step 6 (1.7 seconds for this record). The accelerations obtained in Step 6 are used to compute the spectra. The pseudo-velocity response spectrum (PSV), the relative displacement response spectrum (SD), the pseudo-acceleration response spectrum (PSA), and the Fourier amplitude spectrum (FS) are plotted on tripartite logarithmic paper and presented in this report.

DIGITIZATION NOISE LEVEL

As discussed above, Fig. 6 shows the average noise spectrum for the CSMIP digitization system. It is also useful to consider the noise characteristics in terms of actual time-domain amplitudes. Fig. 7 shows typical noise amplitudes present in acceleration, in velocity, and in displacement time histories obtained for different

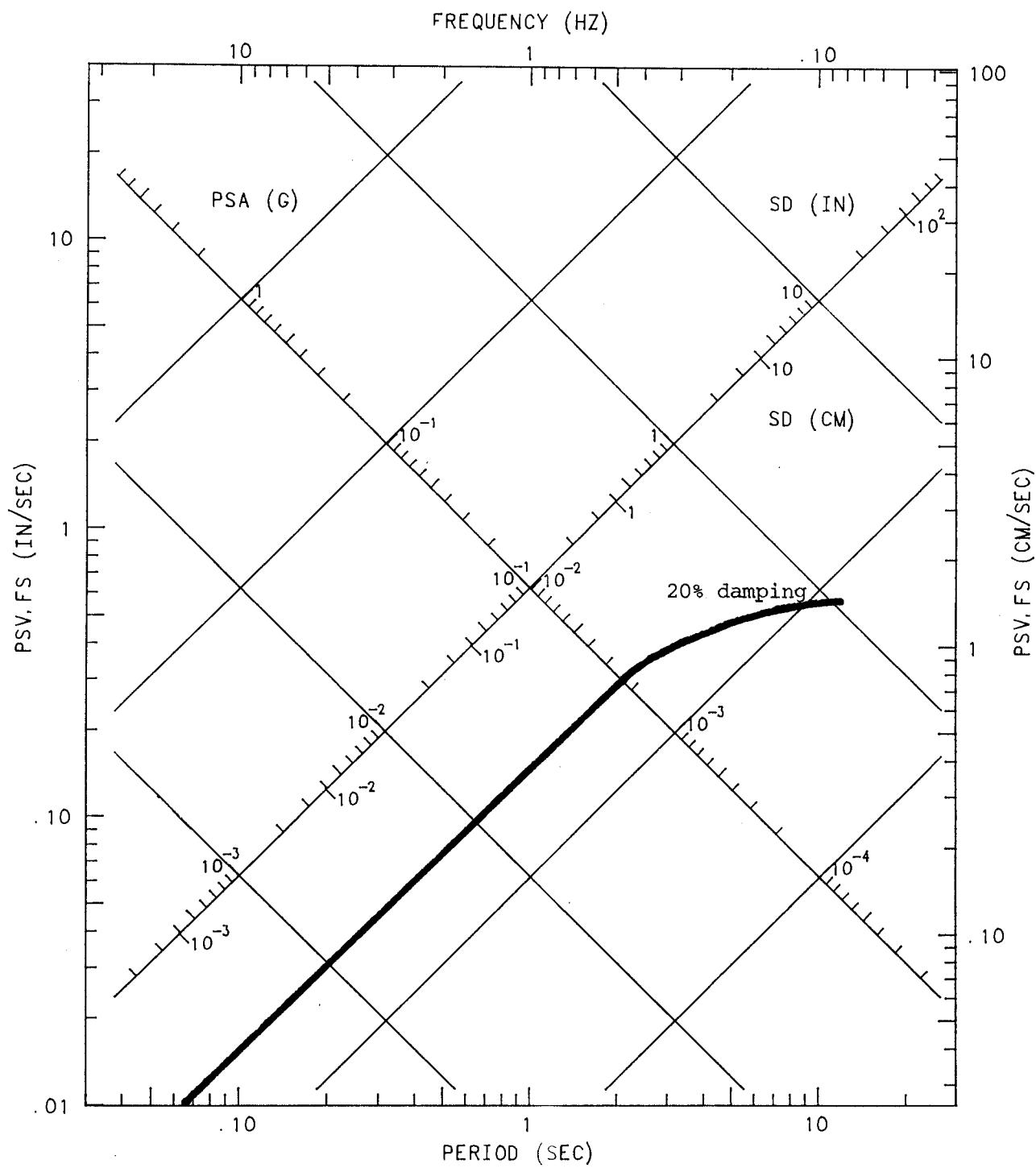


Fig. 6. Noise-level spectra (PSV, 20% damping) for the CSMIP digitization system (from Shakal and Ragsdale, 1984).

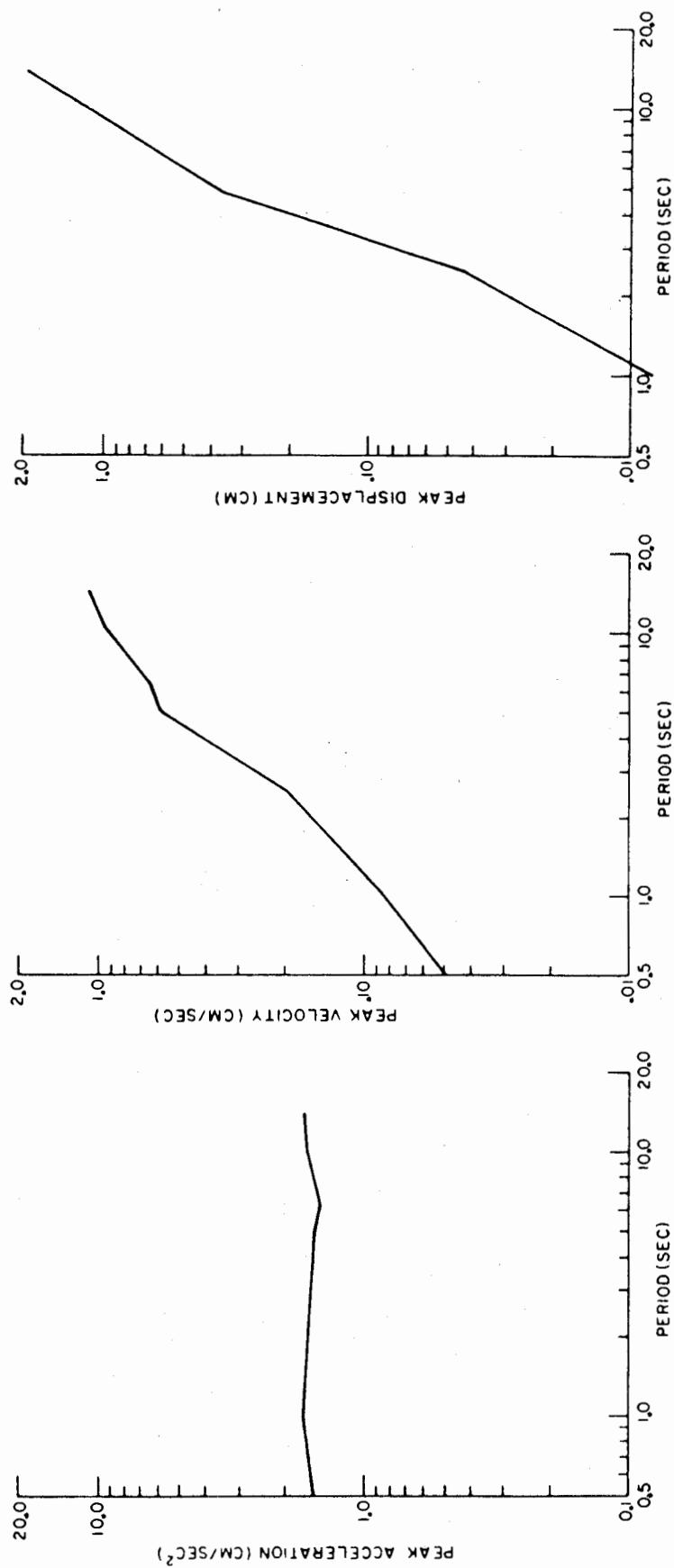


Fig. 7. Processing noise present in a typical acceleration (left), velocity (middle) and displacement (right) record processed with a long-period filter cut-off period ranging from 0.5 sec to 15 secs (from Shakal and Ragsdale, 1984).

long-period filter cutoff settings. For example, Fig. 7 indicates that for an accelerogram filter cutoff near 1 second (approximately that used for the Rancho Cucamonga record), the expected noise level is near 0.002 g in acceleration, 0.08 cm/sec in velocity, and 0.008 cm in displacement.

The low-level accelerations recorded at the Rancho Cucamonga Law & Justice building are near the minimum at which the CSMIP digitization is reliable. However, noise analyses indicate that the results of this record are accurate for periods shorter than 1.25 seconds (frequencies above 0.8 Hz).

ACKNOWLEDGMENTS

The California Strong Motion Instrumentation Program extends its appreciation to San Bernardino County which permitted the installation of strong-motion instruments in the Law and Justice Center. Various individuals including W. Gates, G. Hart, J. Kelly, R. Nutt, D. Pallady, C. Poland, C. Rojahn, J. Stratta, A. Tarics and D. Way assisted in planning the sensor layout for this building. Field installation of instruments and recovery of the records were ably performed by the program technical staff. The joint efforts of all those involved made possible the publication of these data.

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DATA AVAILABILITY

The processed data presented in this report are available on a magnetic tape (named REDLANDS85) which contains Vol. I (uncorrected accelerations), Vol. II (corrected accelerations, velocities and displacements), and Vol. III (response and Fourier amplitude spectra) data. They are written in a standard CSMIP format similar to that of the Caltech tapes, described in Shakal and Huang (1985). The tape (9 track) is available in standard ASCII or EBCDIC blocked (unlabeled) format. The tape, as well as copies of structural drawings and detailed locations of the sensors in the building, can be obtained at nominal cost from this office.

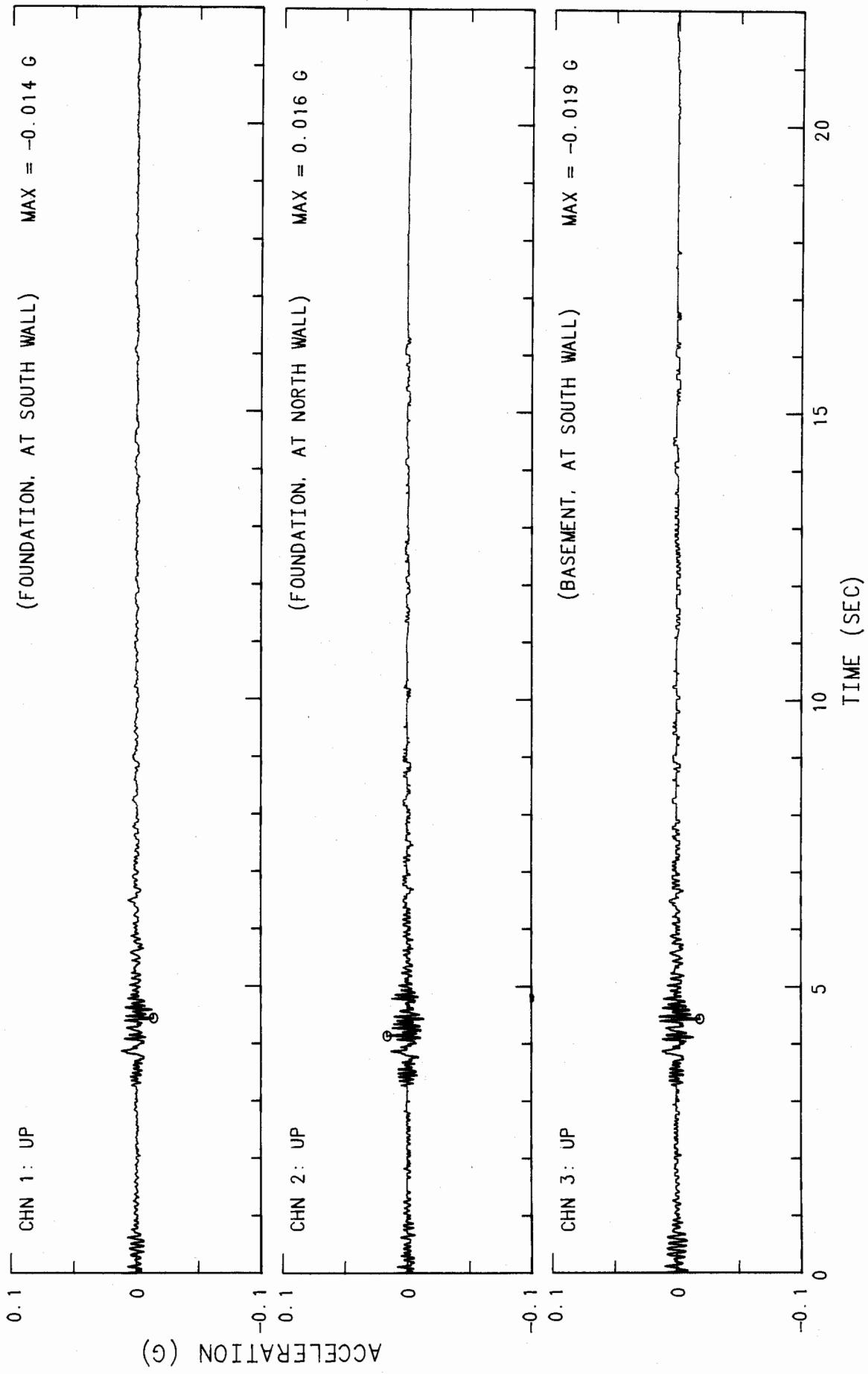
APPENDIX
PLOTS OF PROCESSED DATA

Organization and Order of Plots

In this appendix, the processed data plots for the Rancho Cucamonga Law and Justice building are presented in the following order:

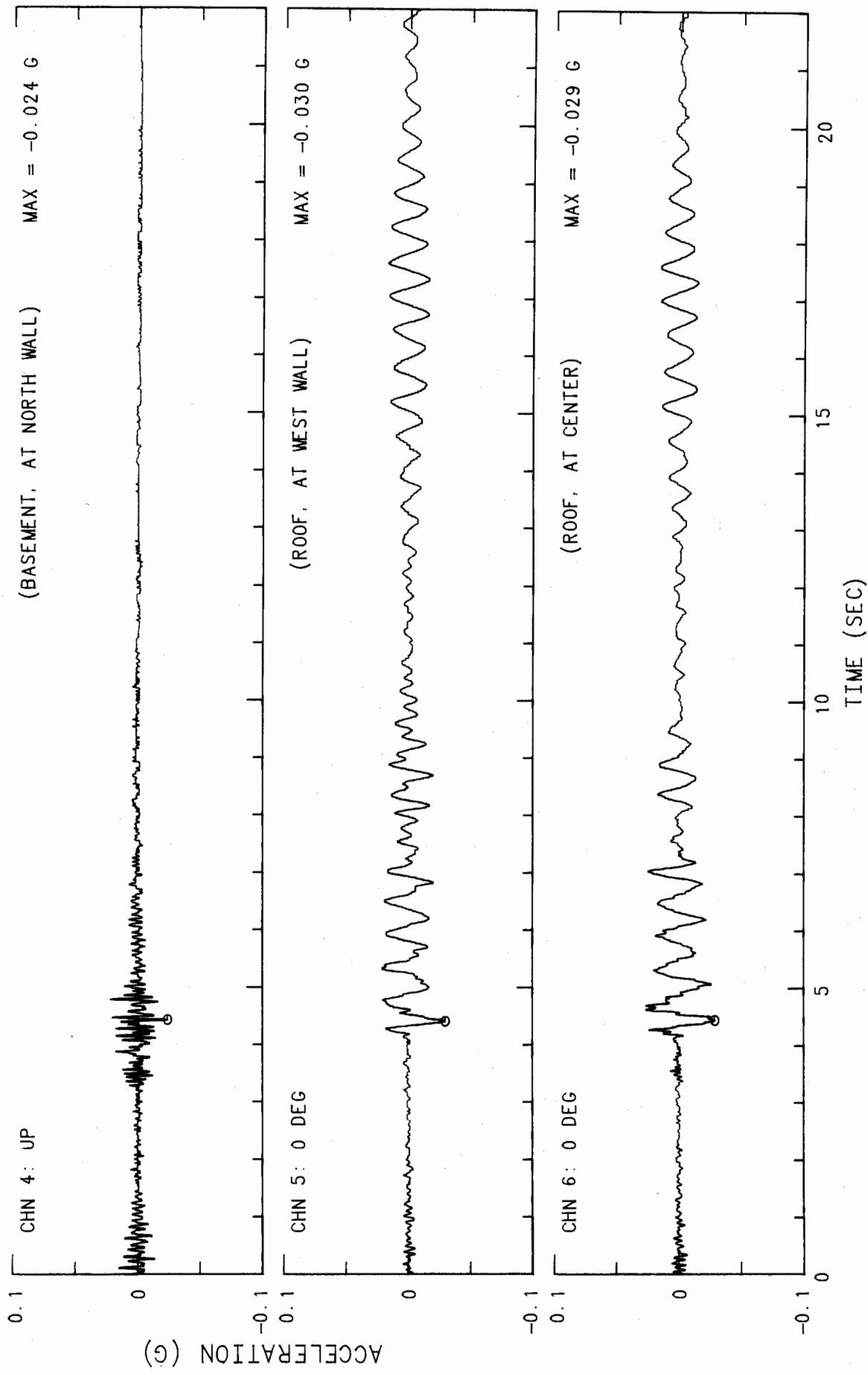
1. Uncorrected accelerograms (Vol. I data). Plots of full digitized length with components uniformly scaled.
2. Instrument and baseline-corrected acceleration, velocity and displacement (Vol. II data). The filters used are indicated on the plots. One plot per component, plotted with equal scaling for all components.
3. Response and Fourier amplitude spectra (Vol. III data). One spectral plot per component. The spectra for periods from 0.04 second (25 Hz) to 1.7 seconds (0.6 Hz) are plotted in these figures. This period range corresponds to the final filters used in Vol. II processing.

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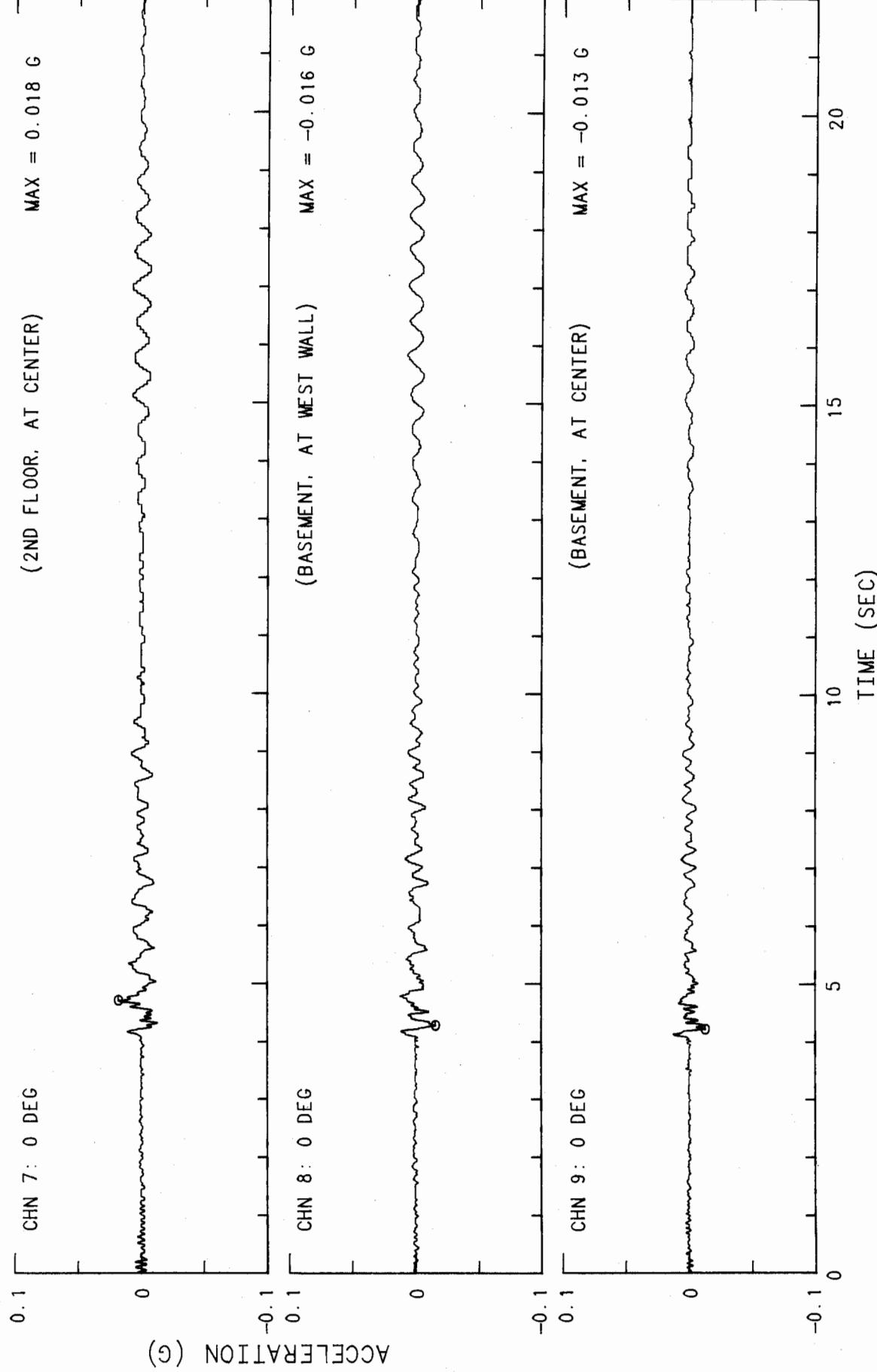
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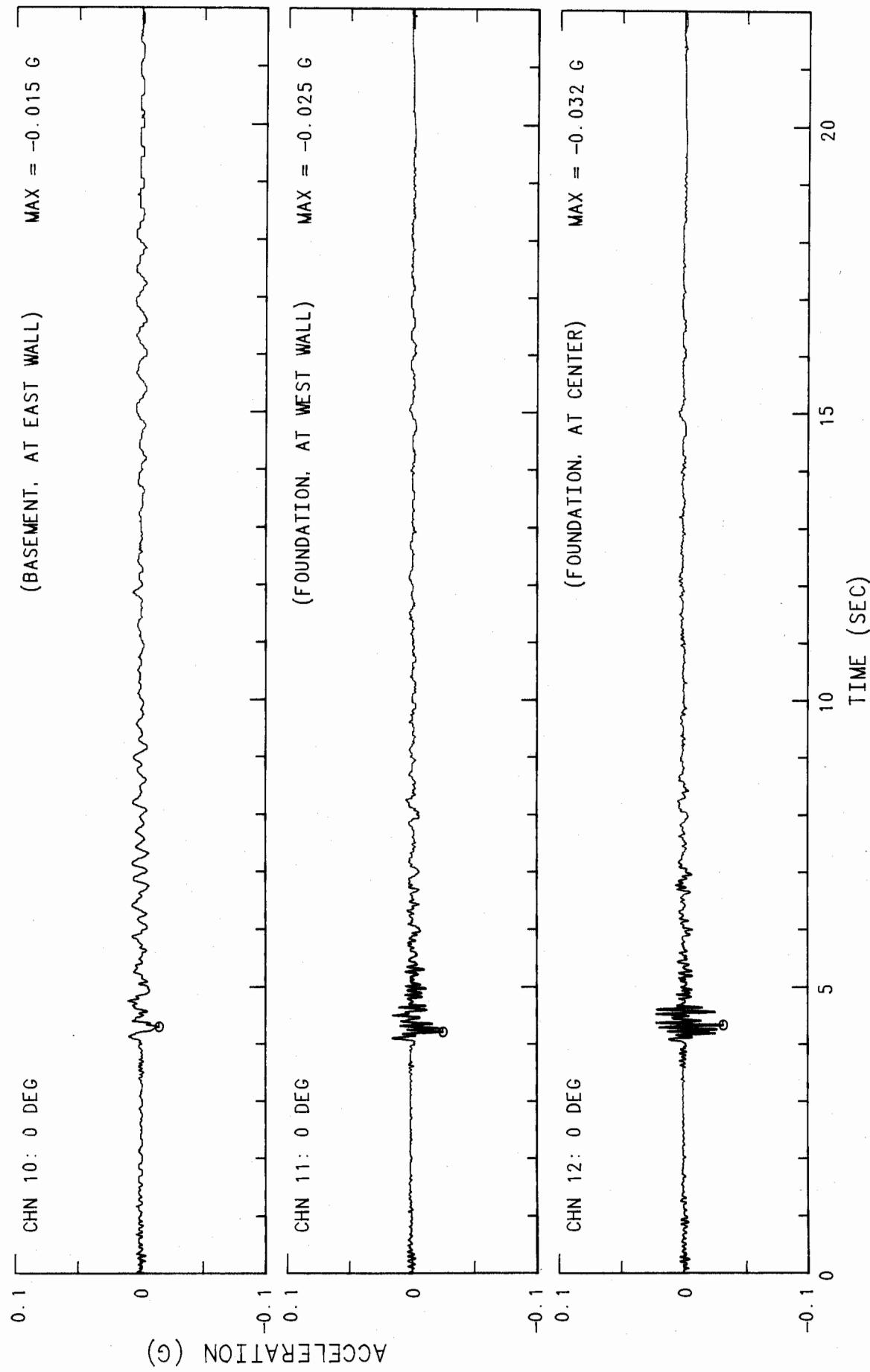
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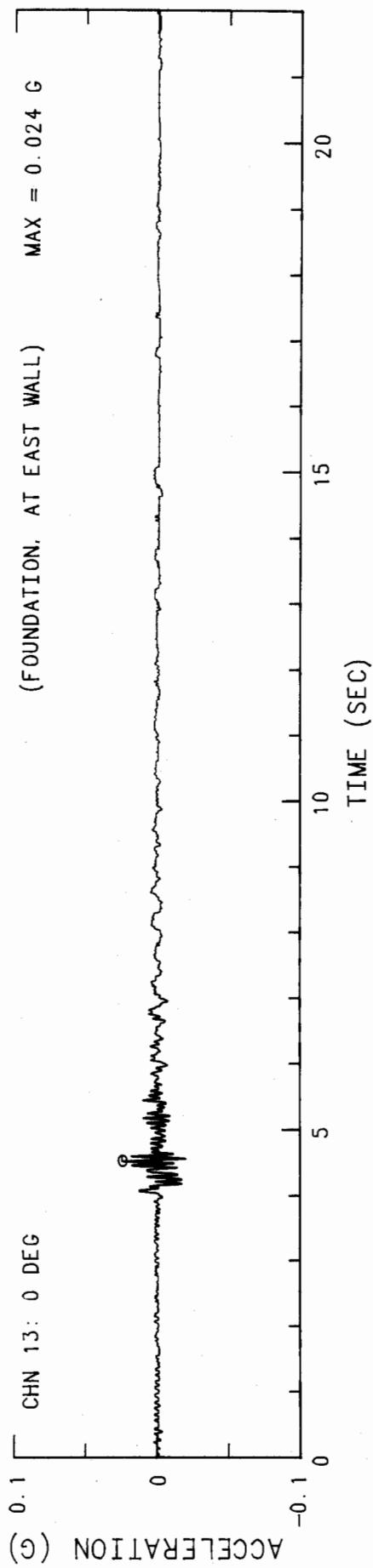


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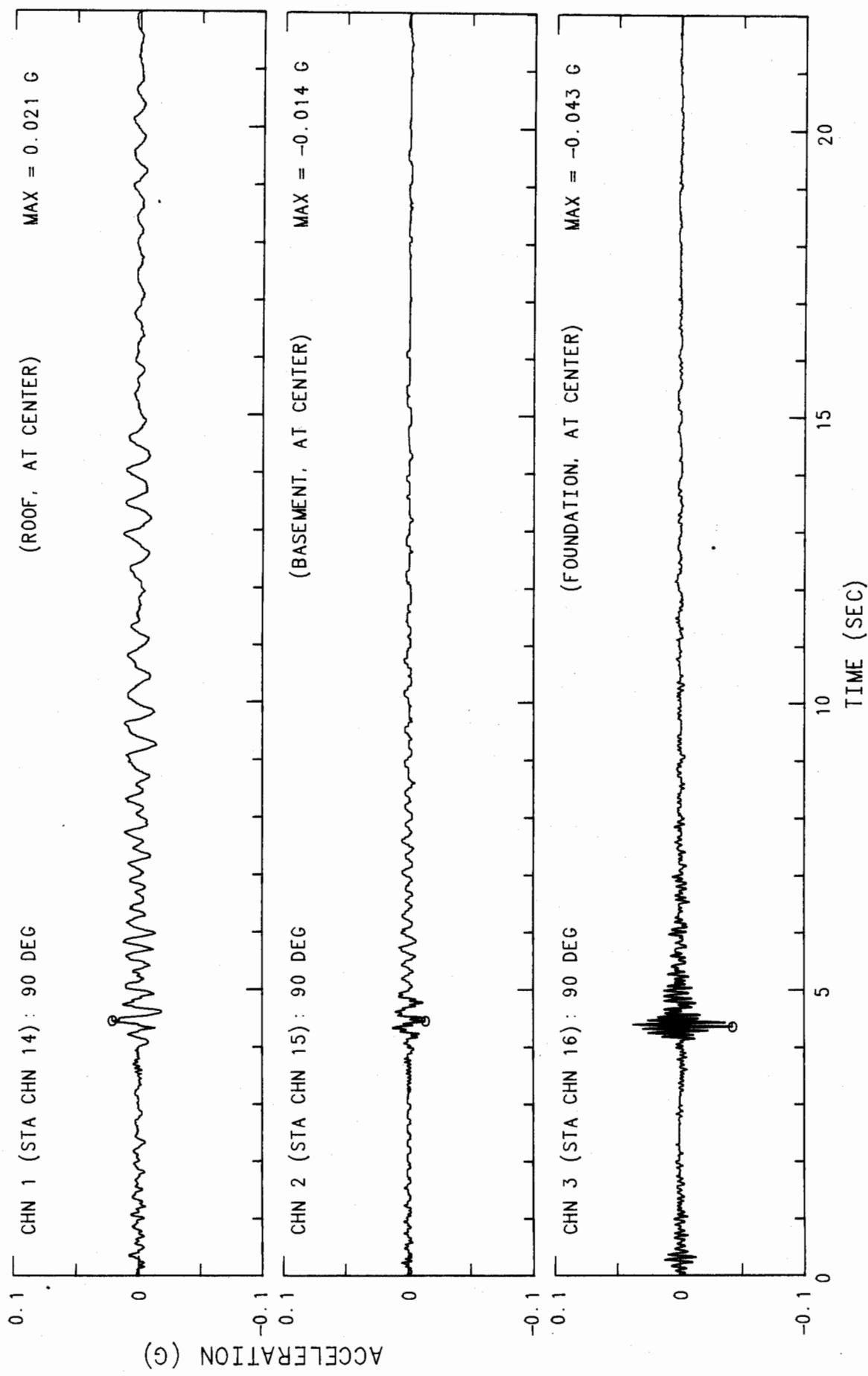
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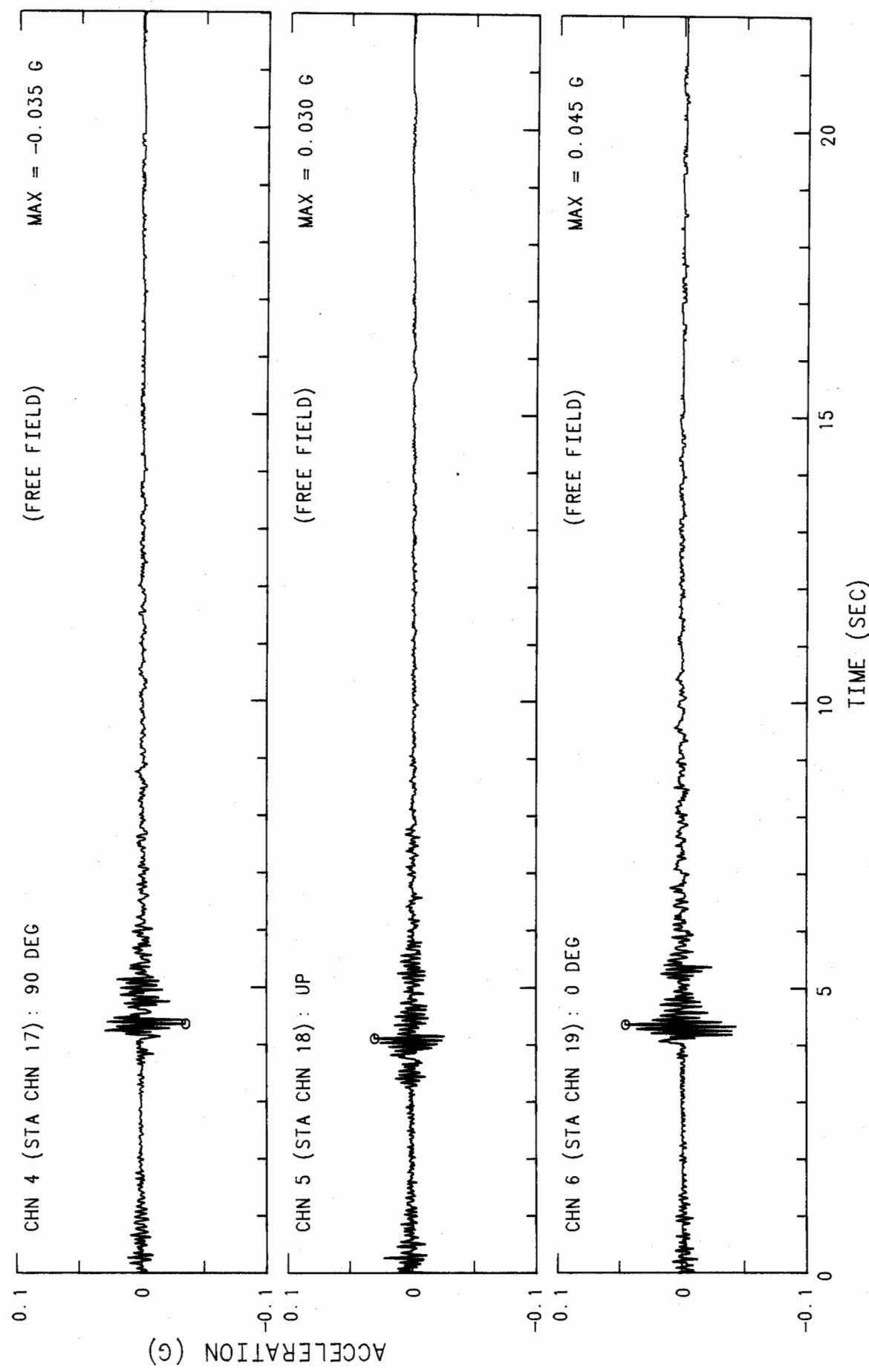


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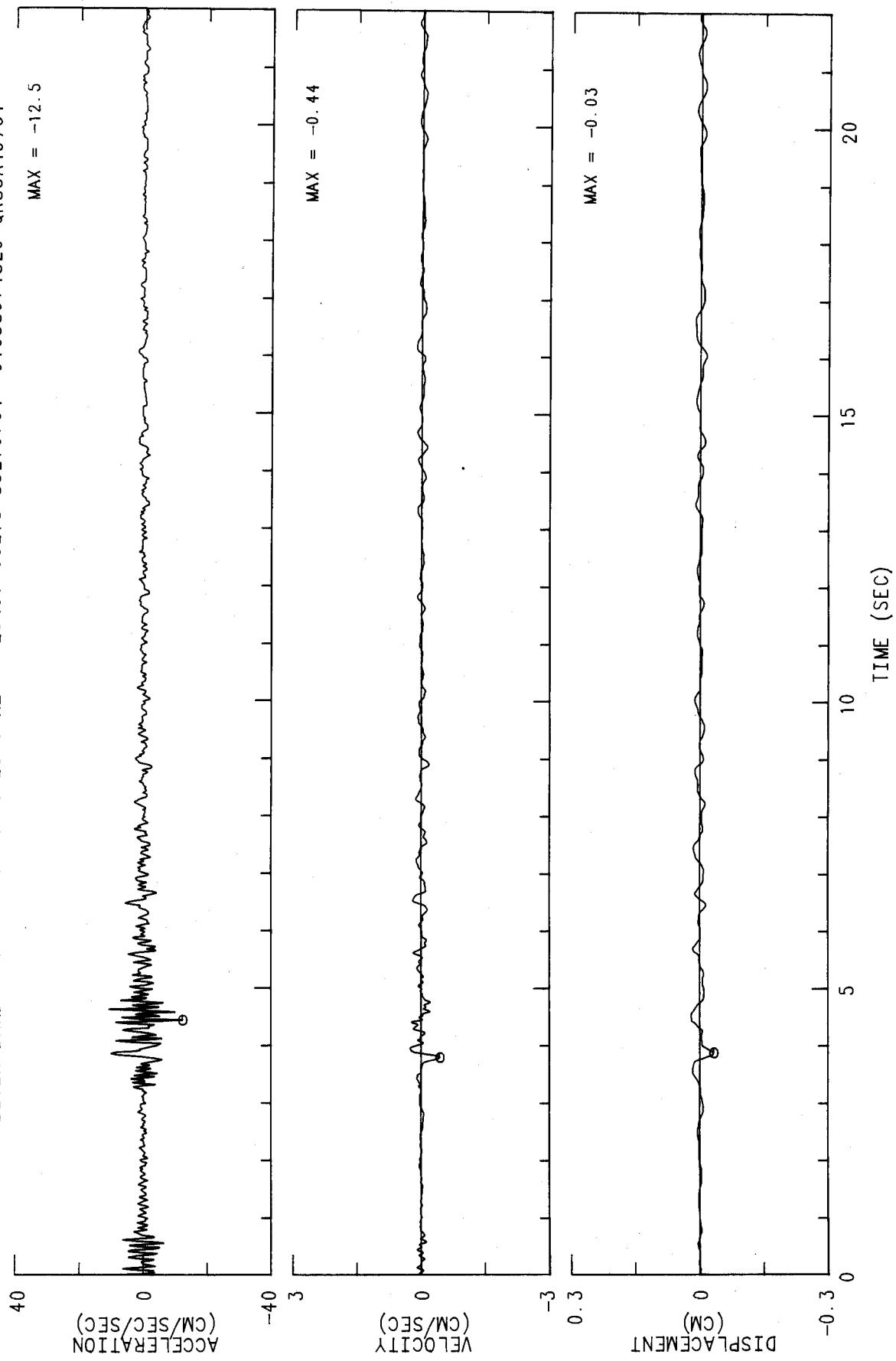
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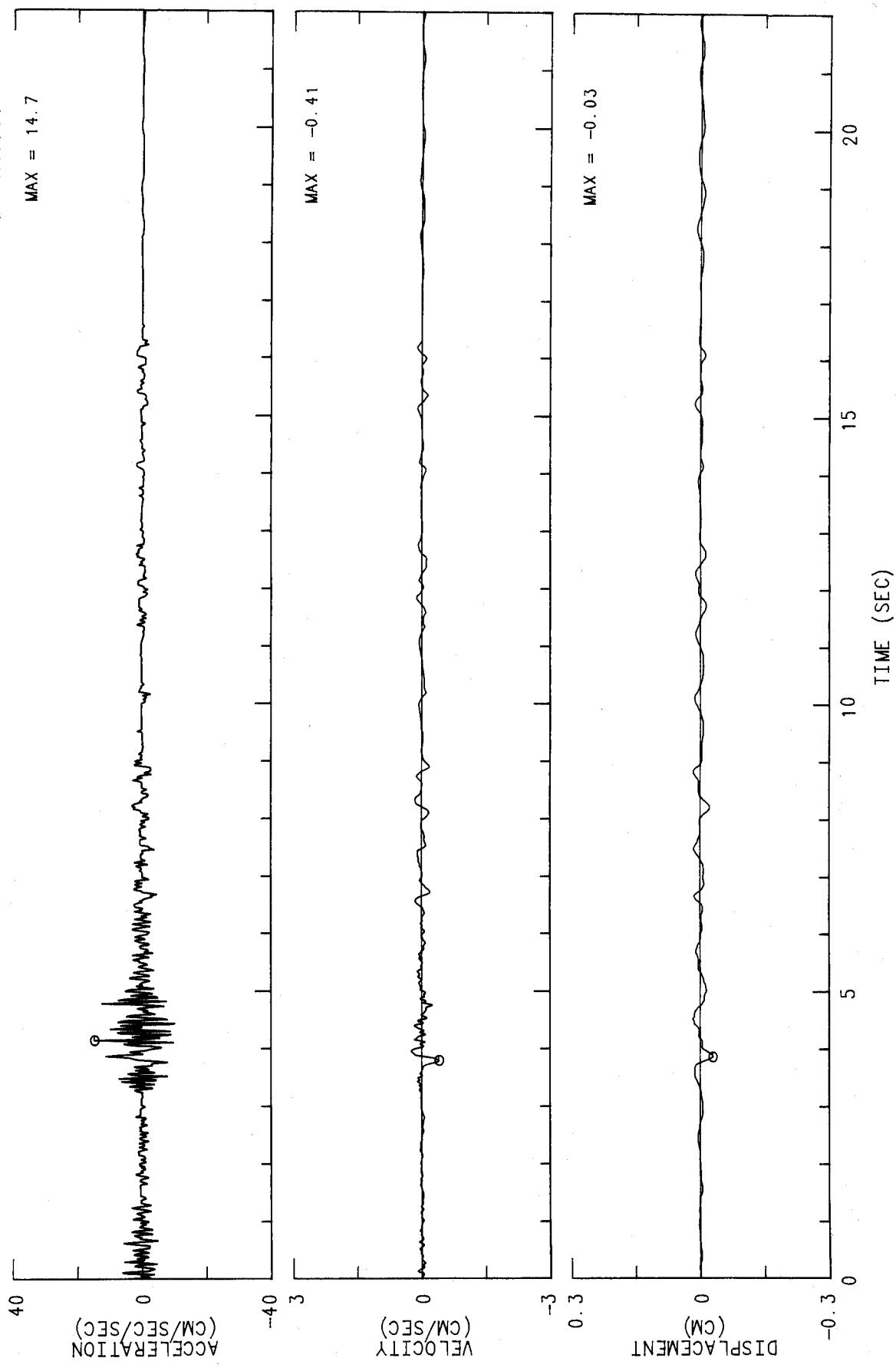
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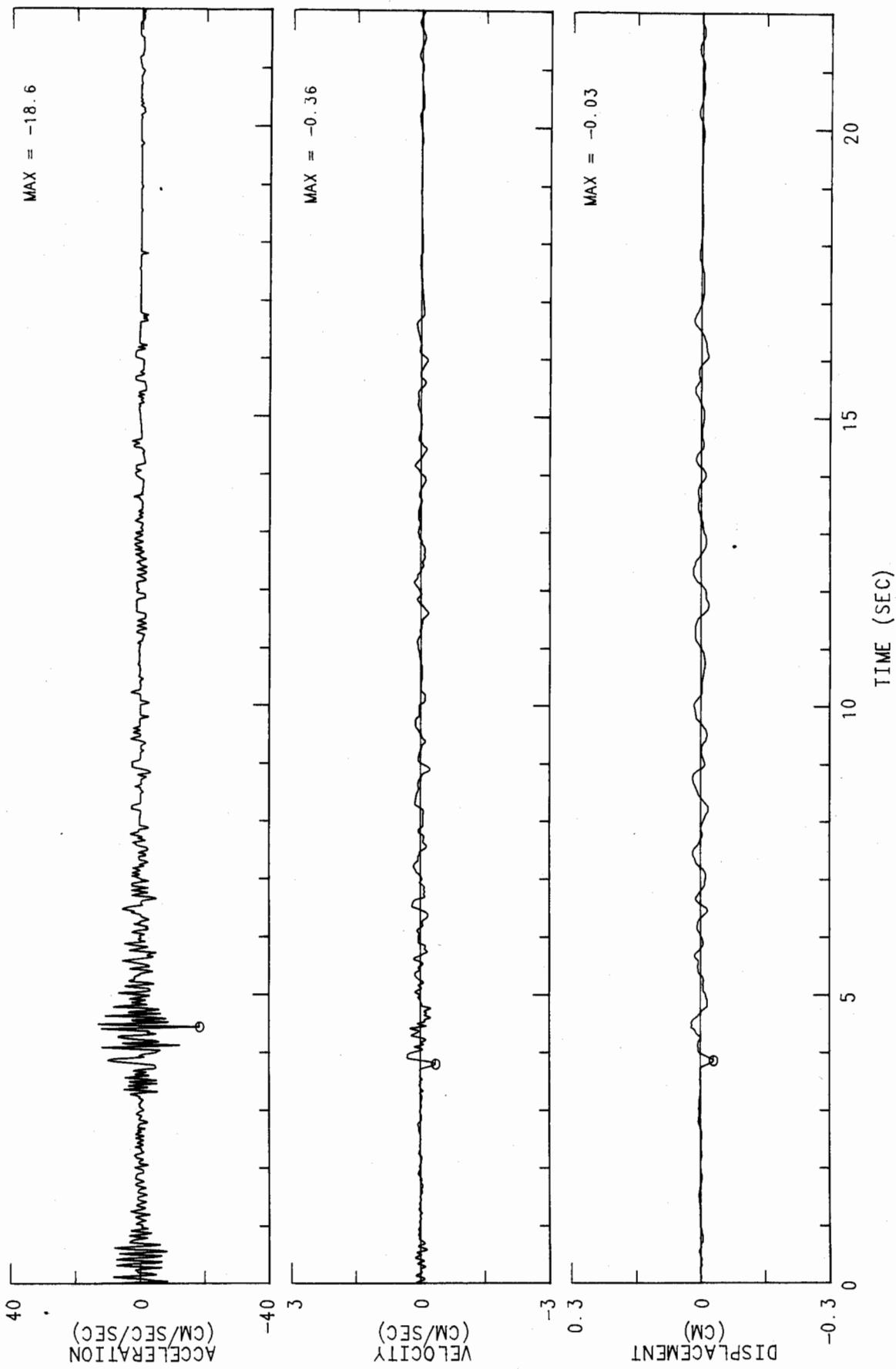
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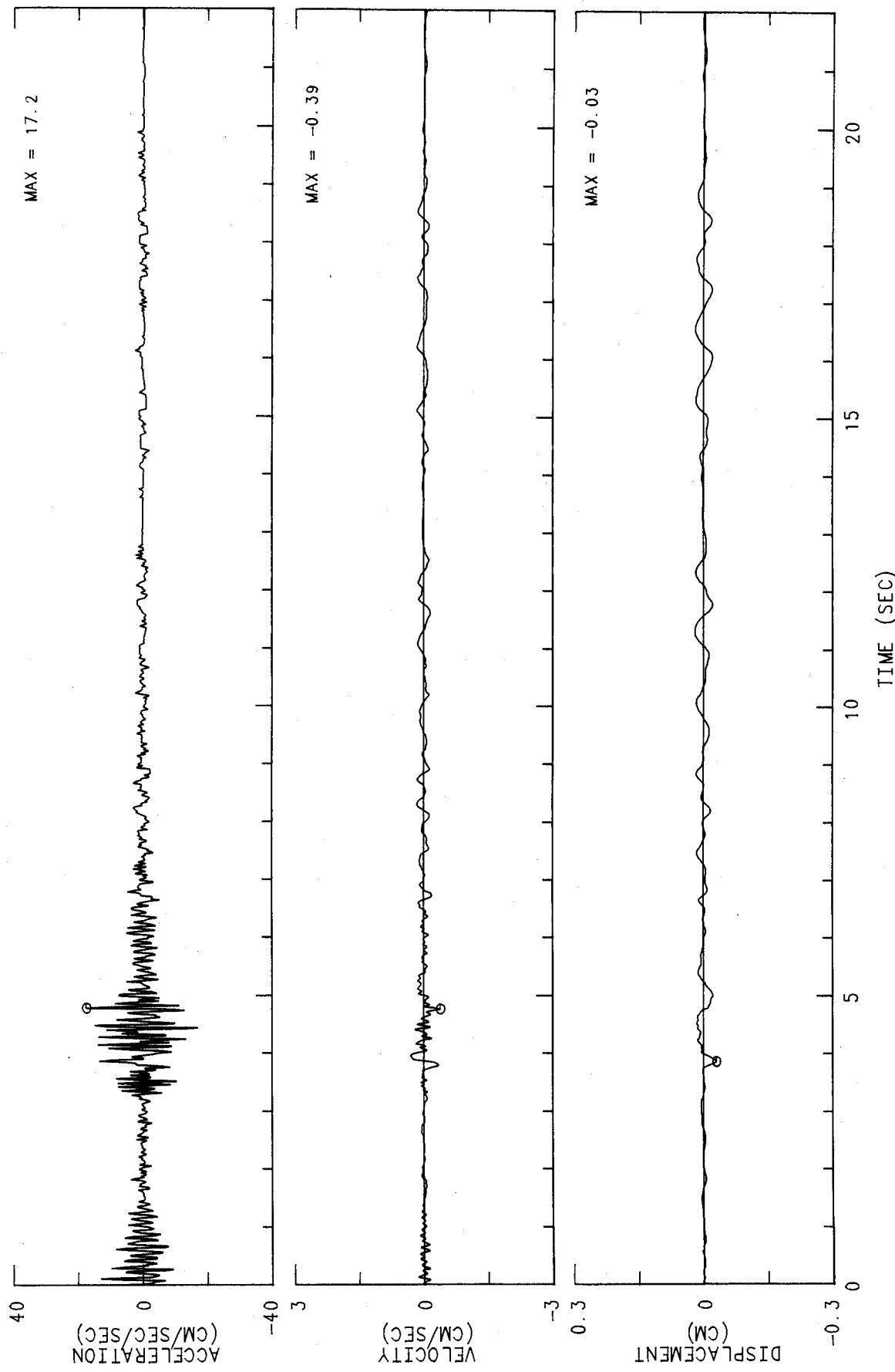
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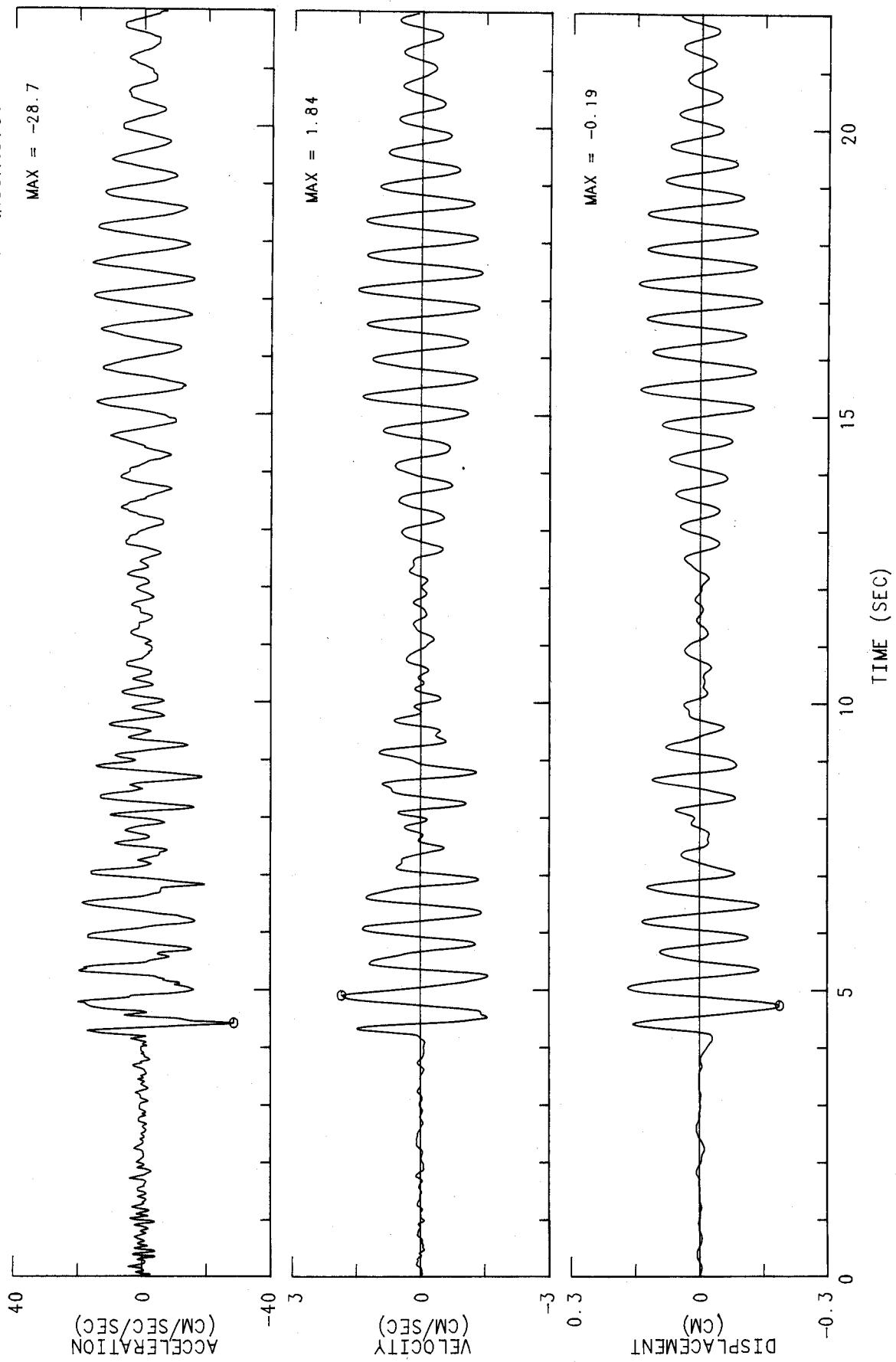
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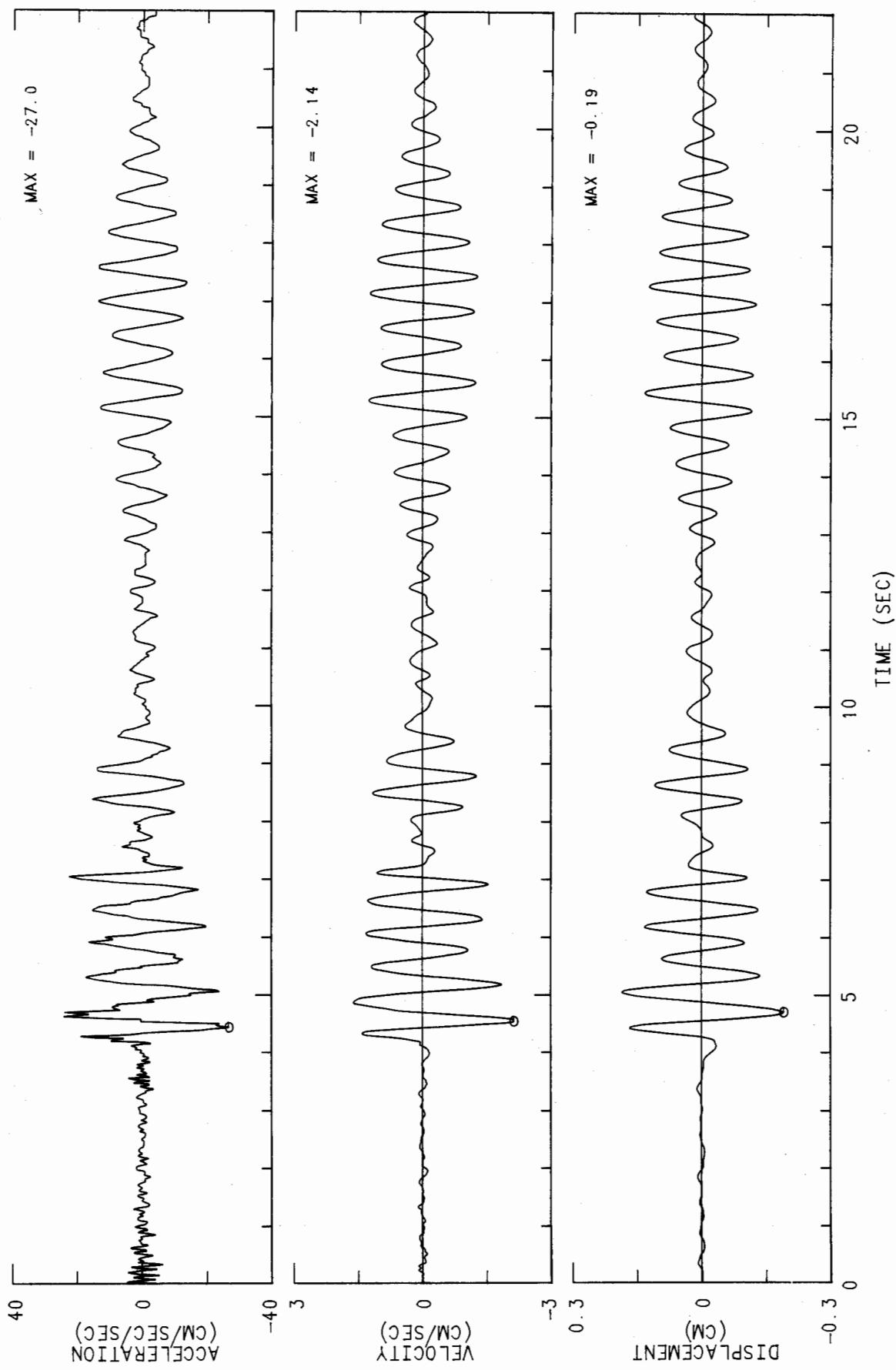
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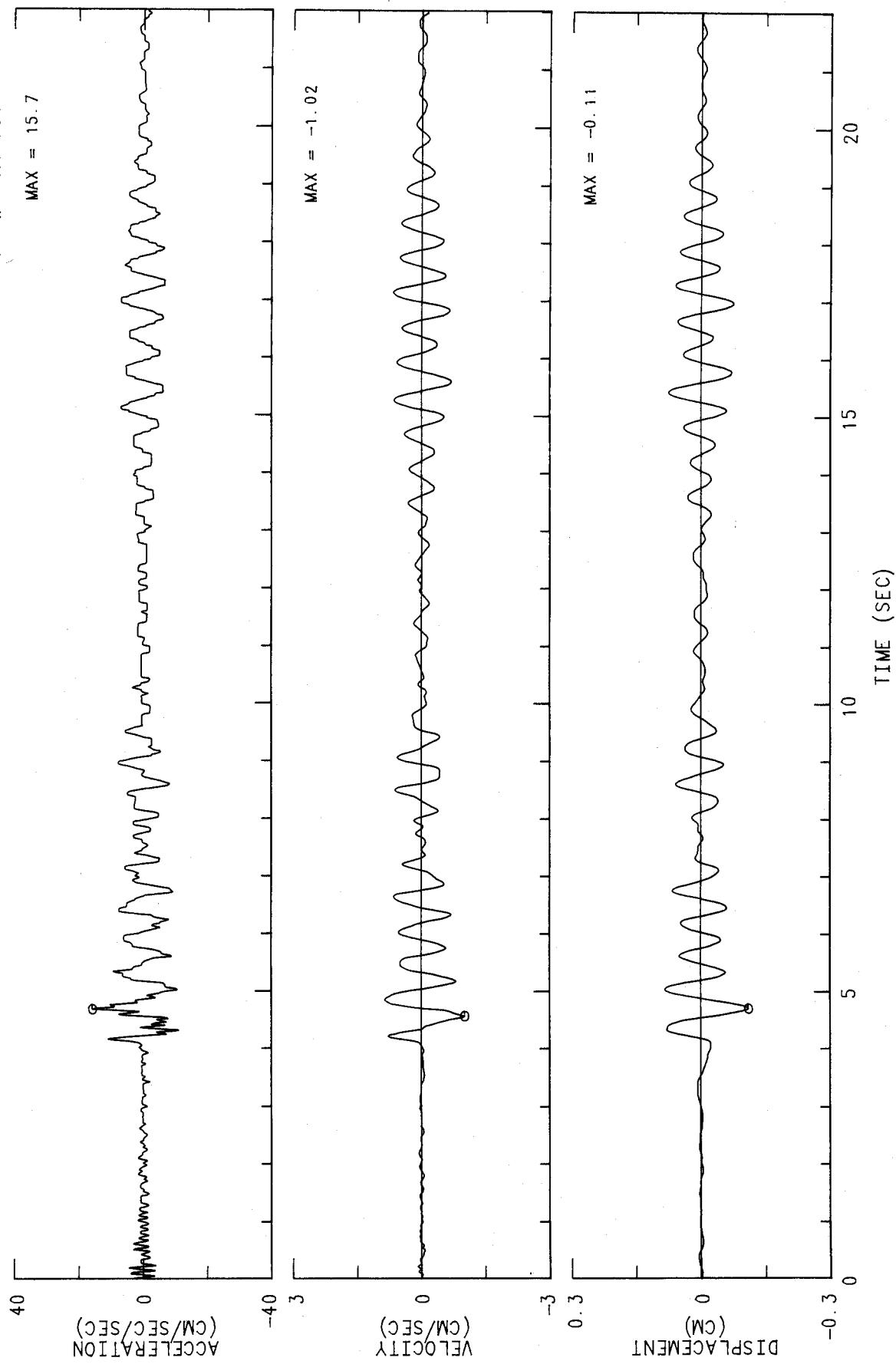
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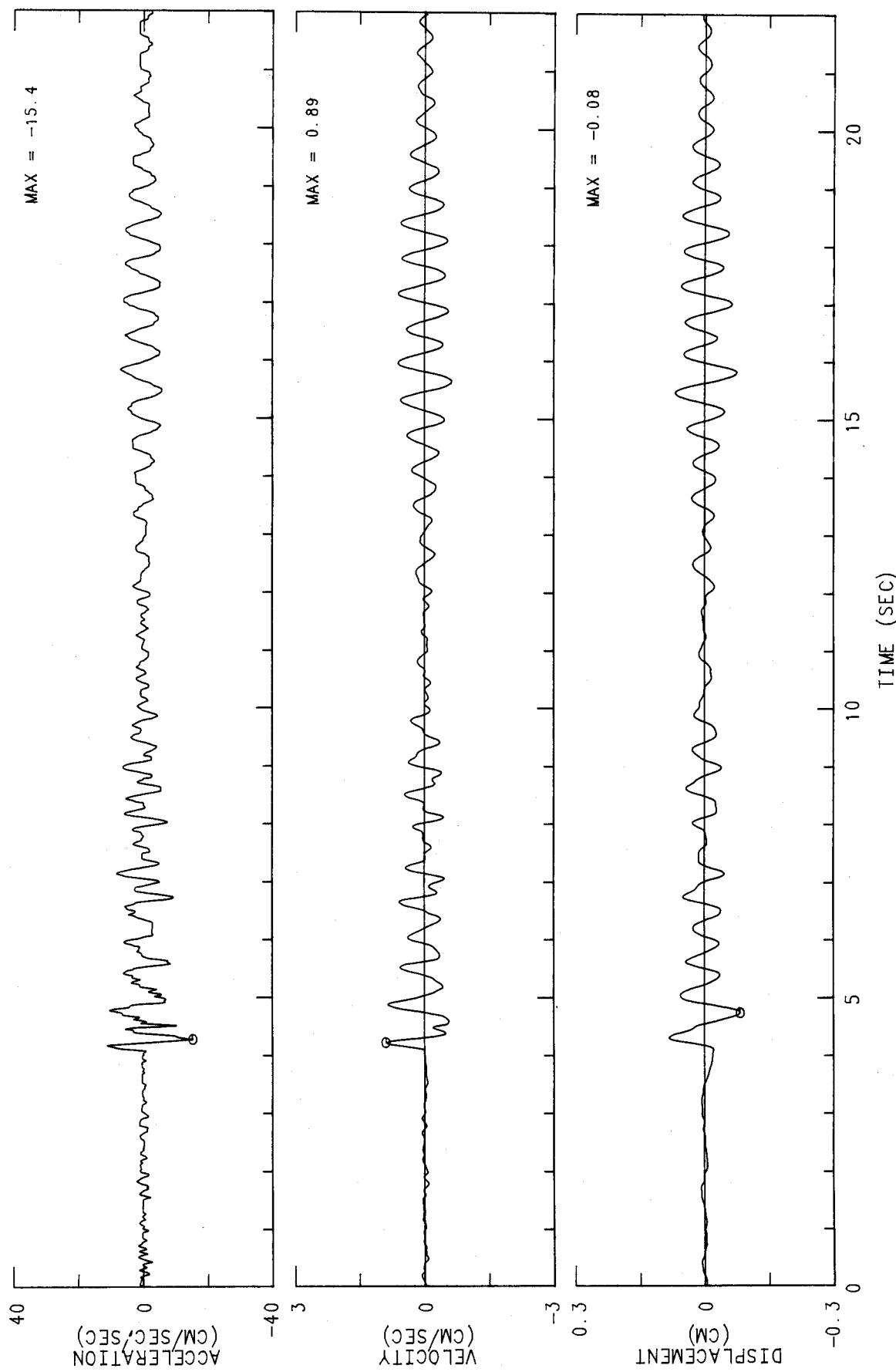
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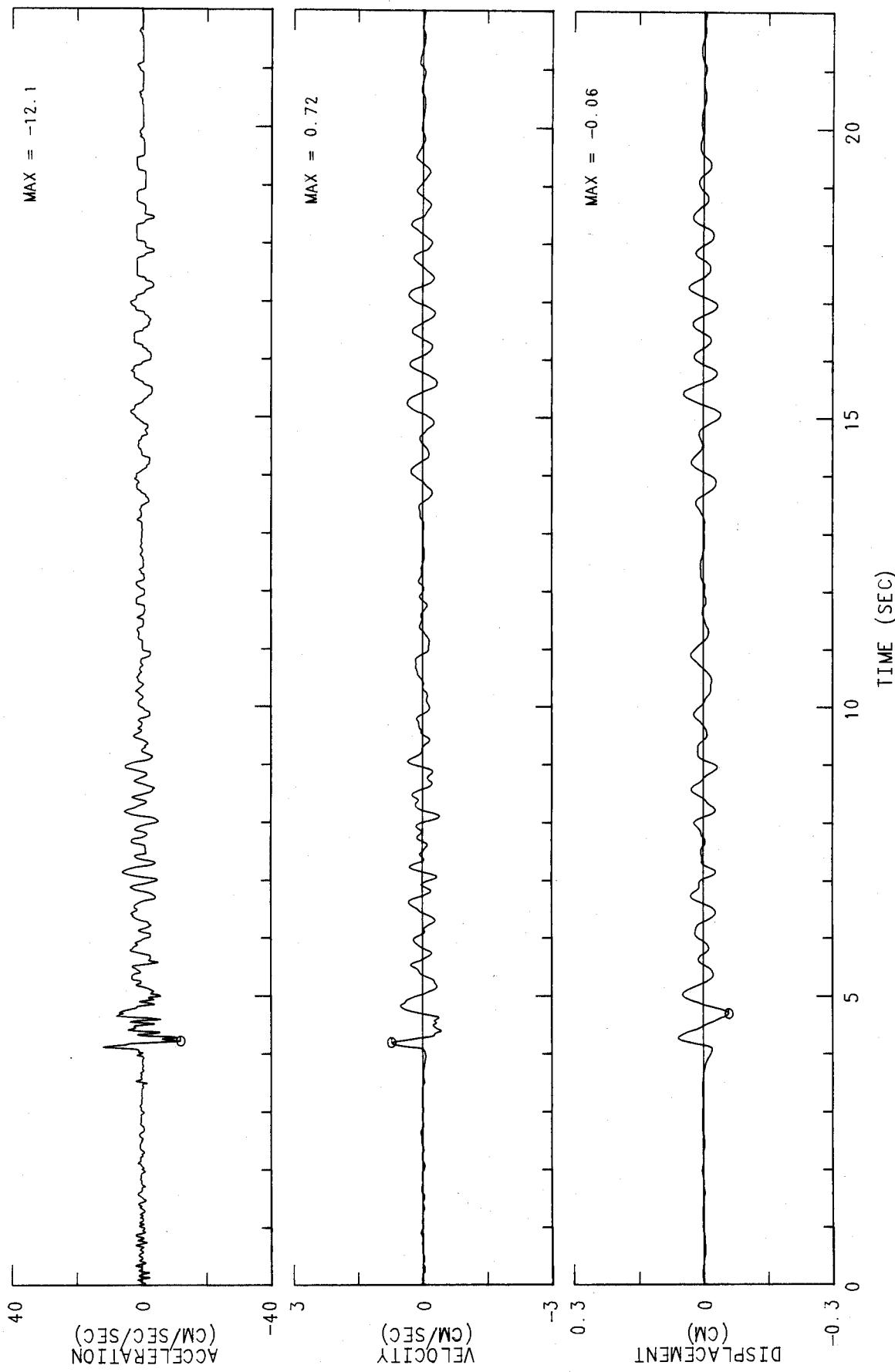
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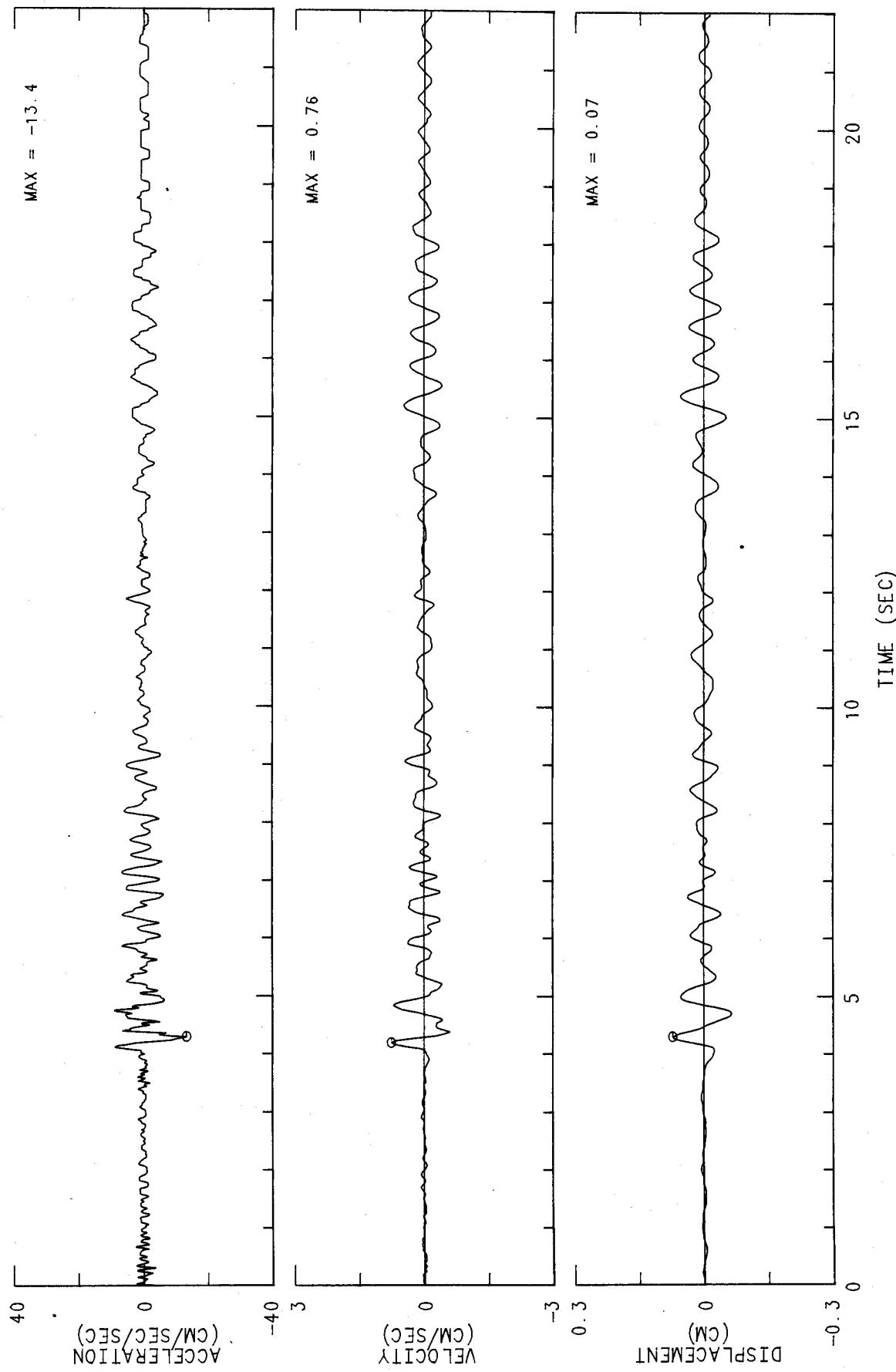
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INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0273-85276.01 010586.1820-QR85A497C1



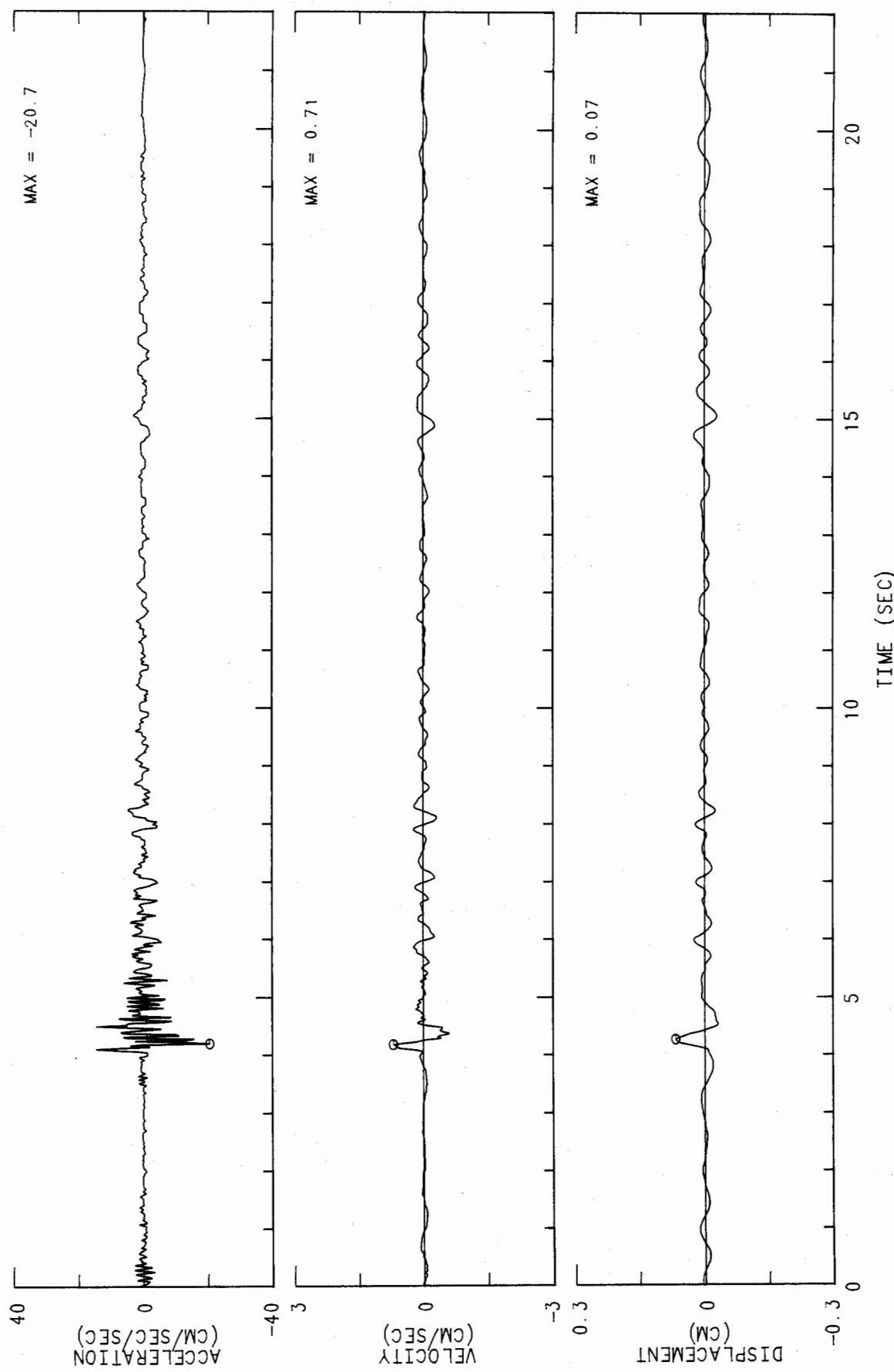
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 9: 0 DEG (BASEMENT, AT CENTER)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0273-85276.01 010586.1820-QR85A497C1



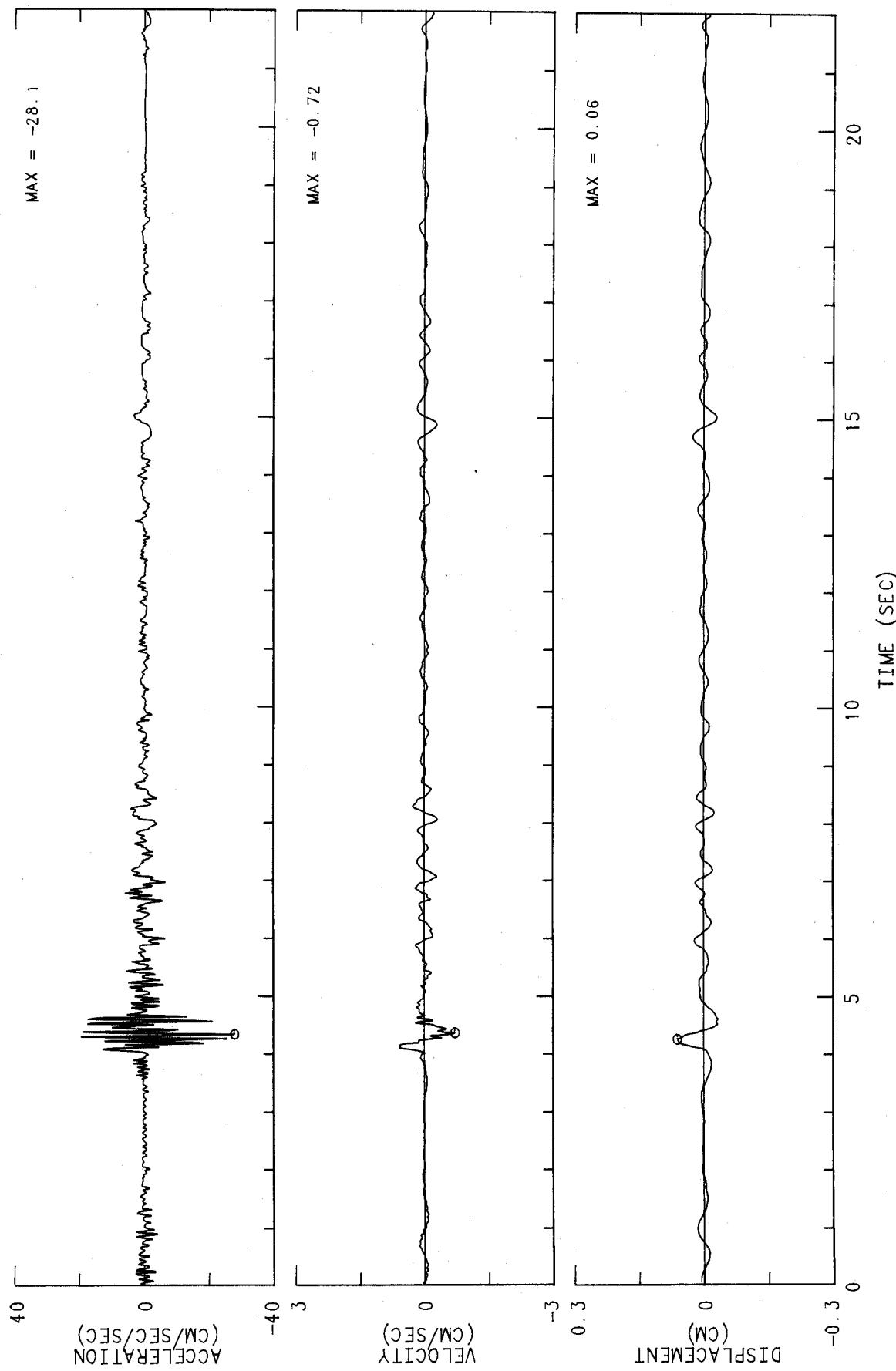
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 10: 0 DEG (BASEMENT, AT EAST WALL)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 Hz. 23497-C0273-85276.01 010586.1820-QR85A497C1



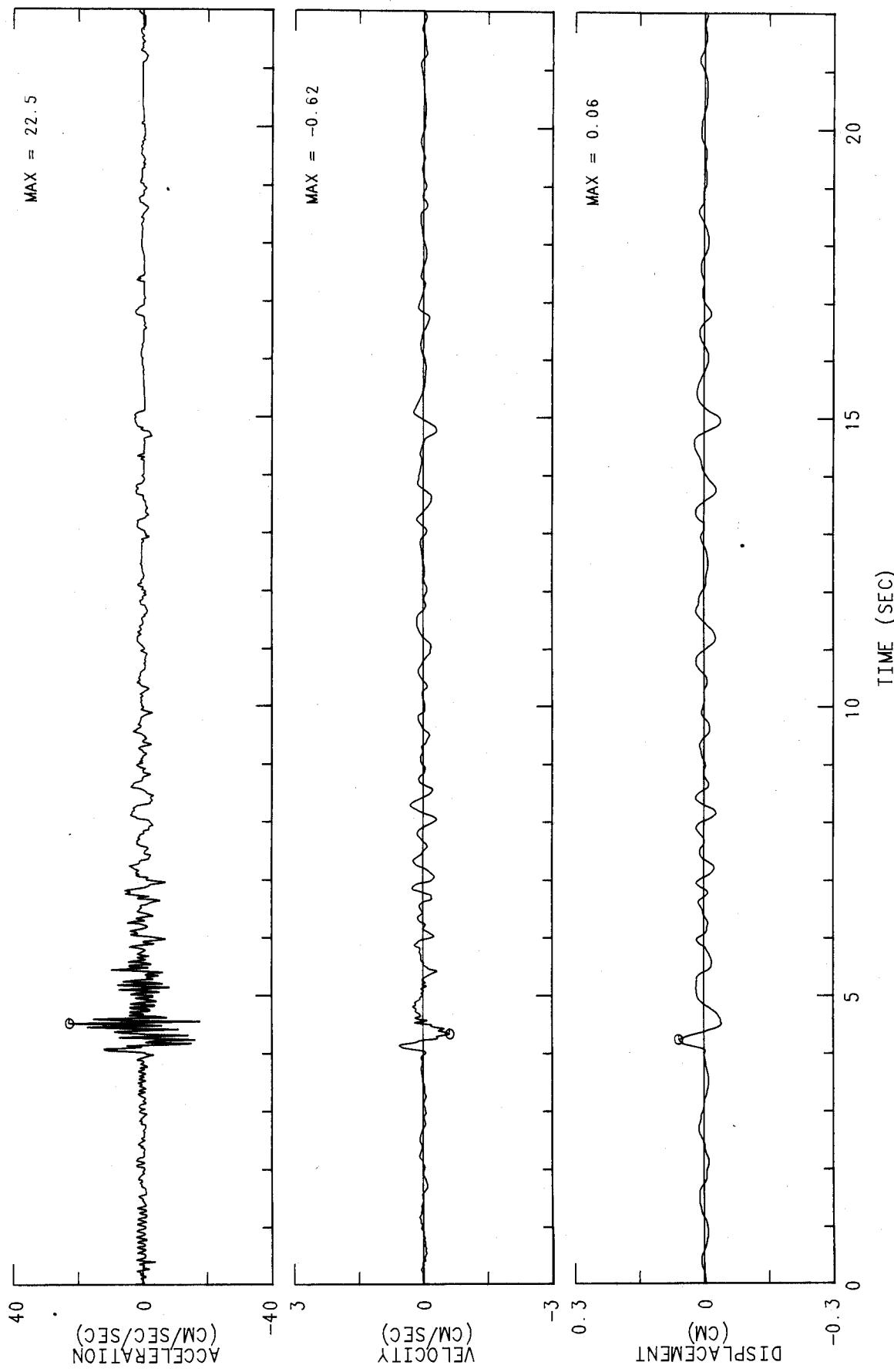
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RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 11: 0 DEG (FOUNDATION AT WEST WALL)
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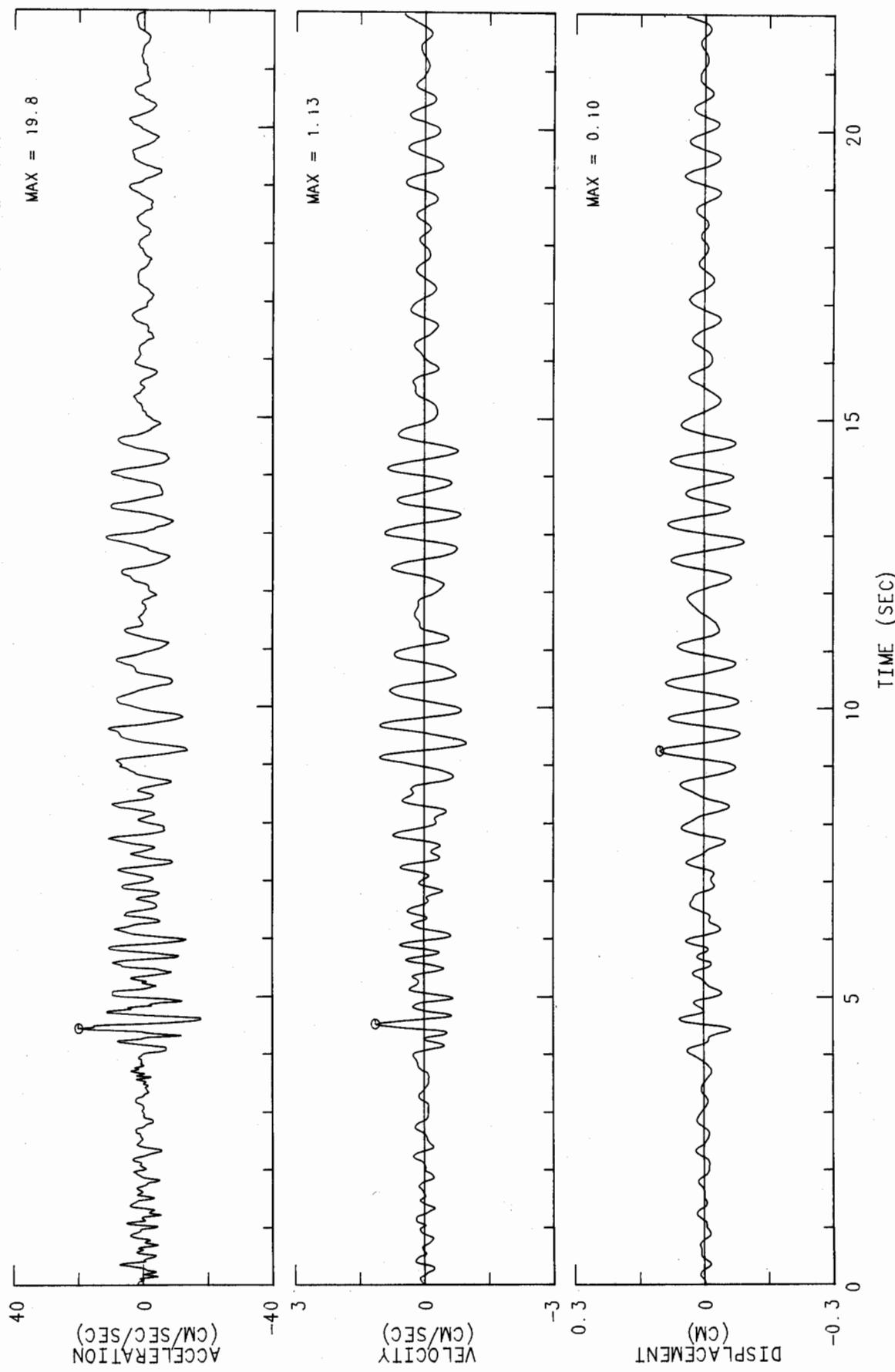
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RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 12: 0 DEG (FOUNDATION, AT CENTER)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0273-85276.01 010586.1820-QR85A497C1



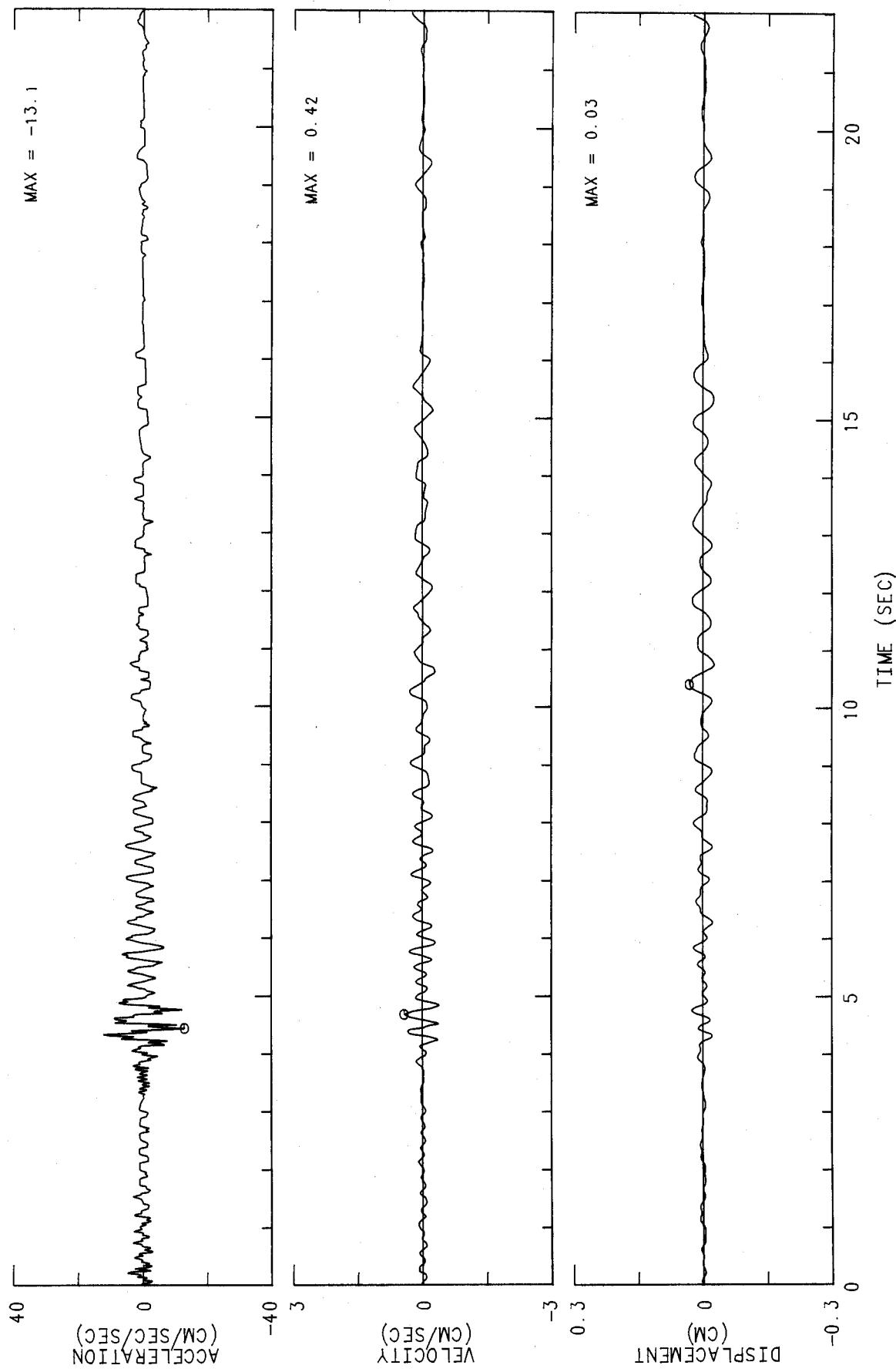
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 13: 0 DEG (FOUNDATION, AT EAST WALL)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0273-85276.01 010586.1820-QR85A497C1



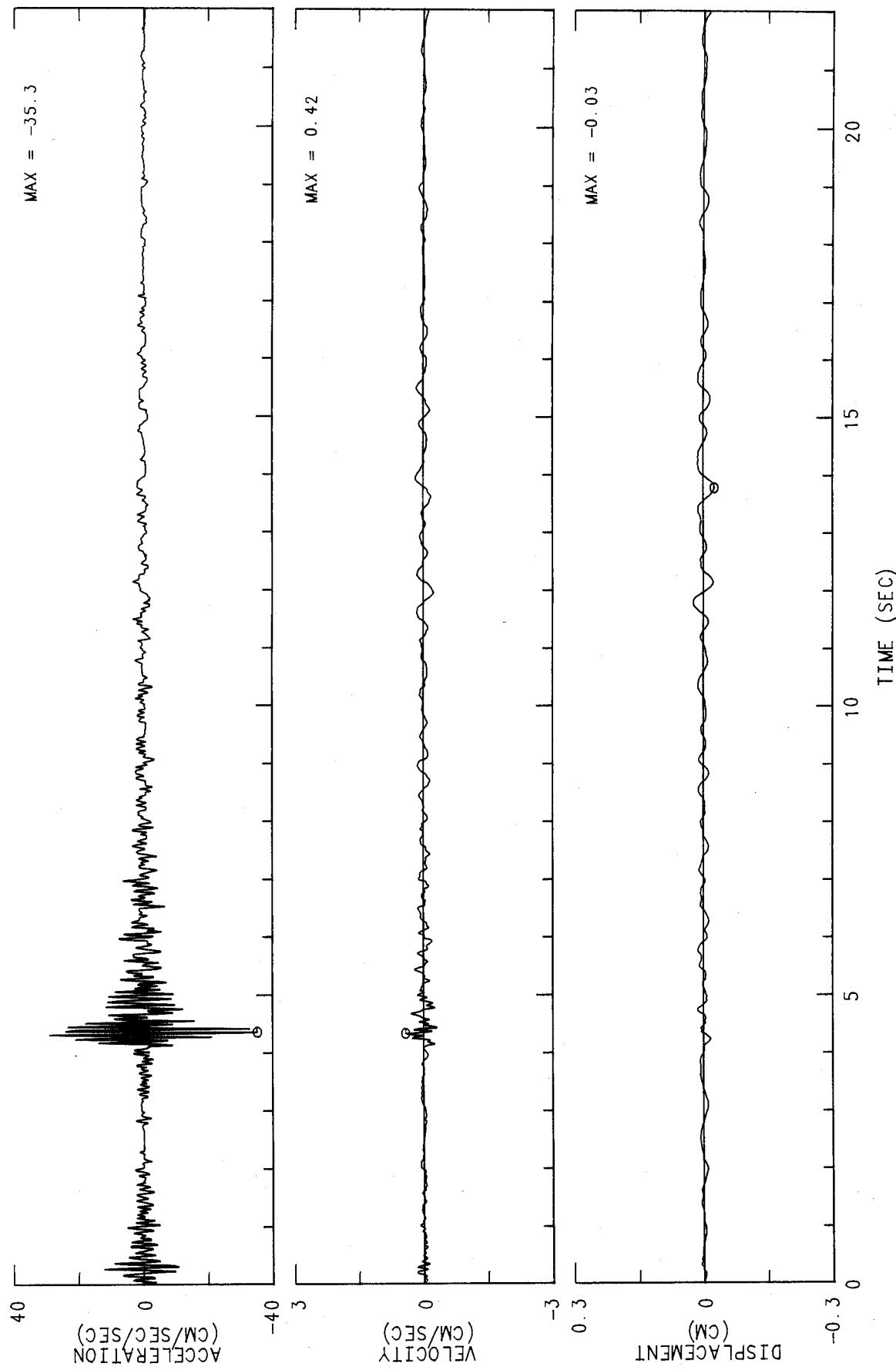
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 1 (STA CHN 14) : 90 DEG (ROOF, AT CENTER)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0118-85276.01 010786.2038-QR85A497



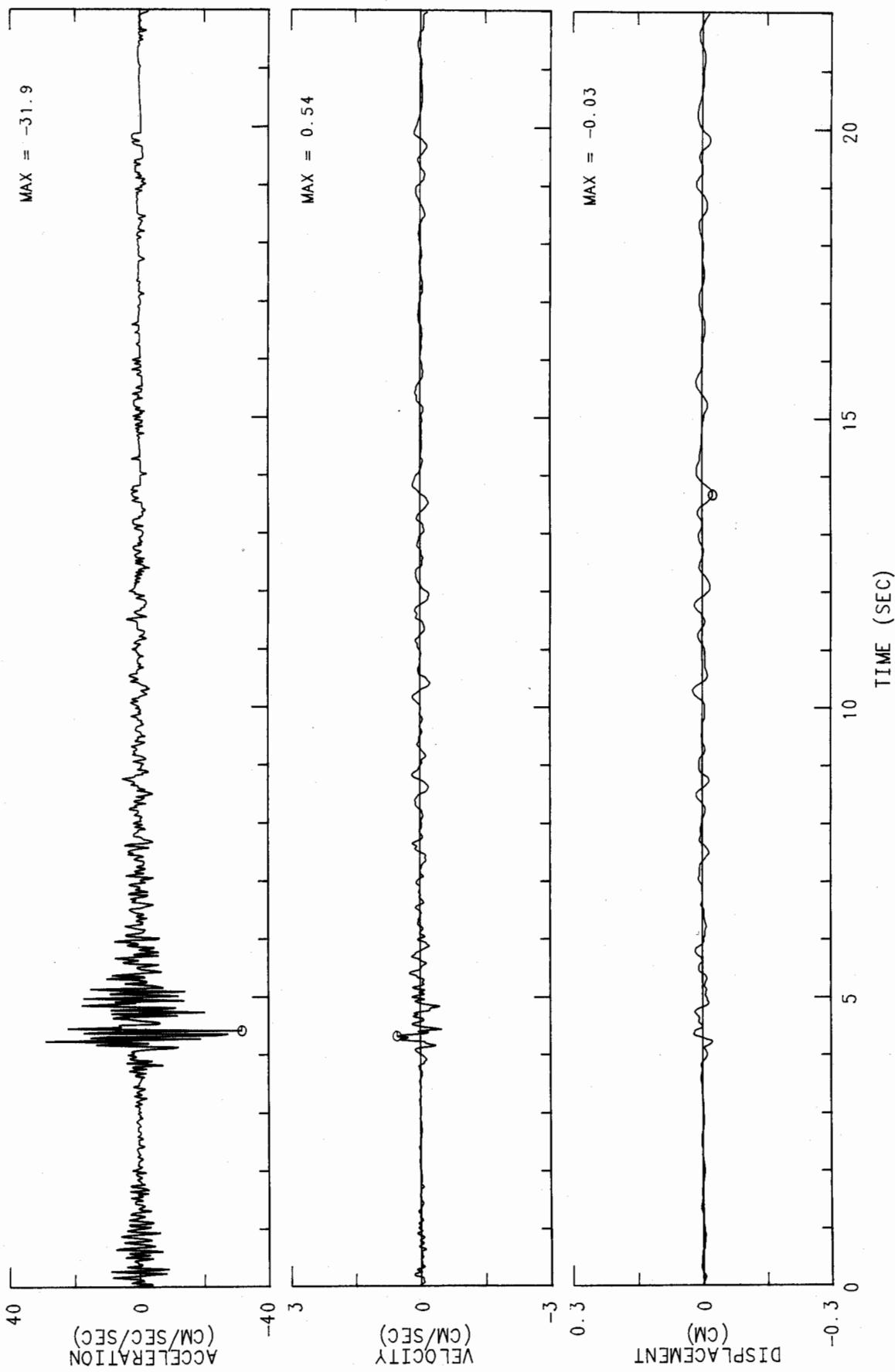
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 2 (STA CHN 15) : 90 DEG (BASEMENT, AT CENTER)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0118-85276.01 010786.2038-QR85A497



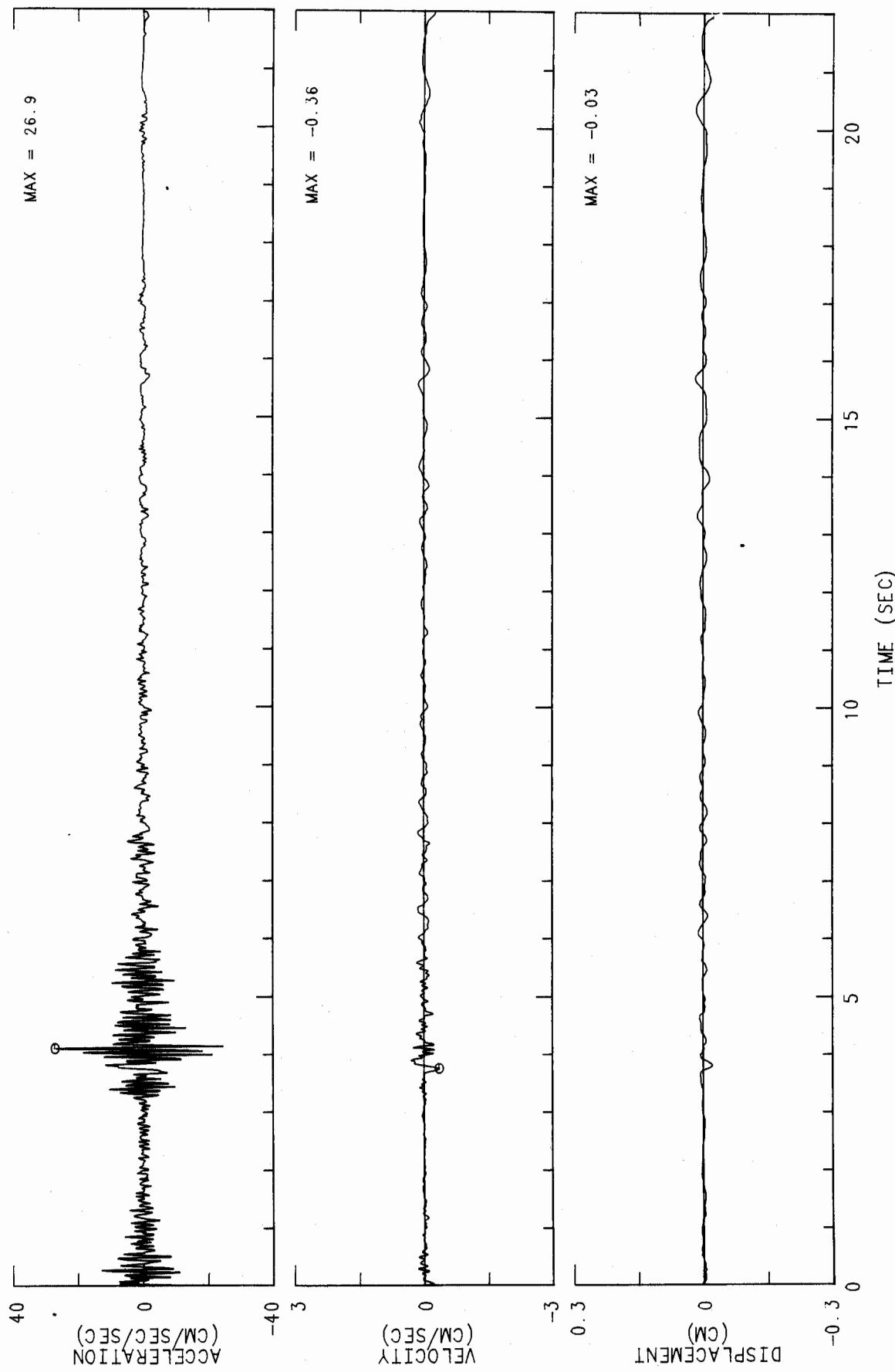
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 3 (STA CHN 16): 90 DEG (FOUNDATION AT CENTER)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0118-85276.01 010786.2038-QR85A497



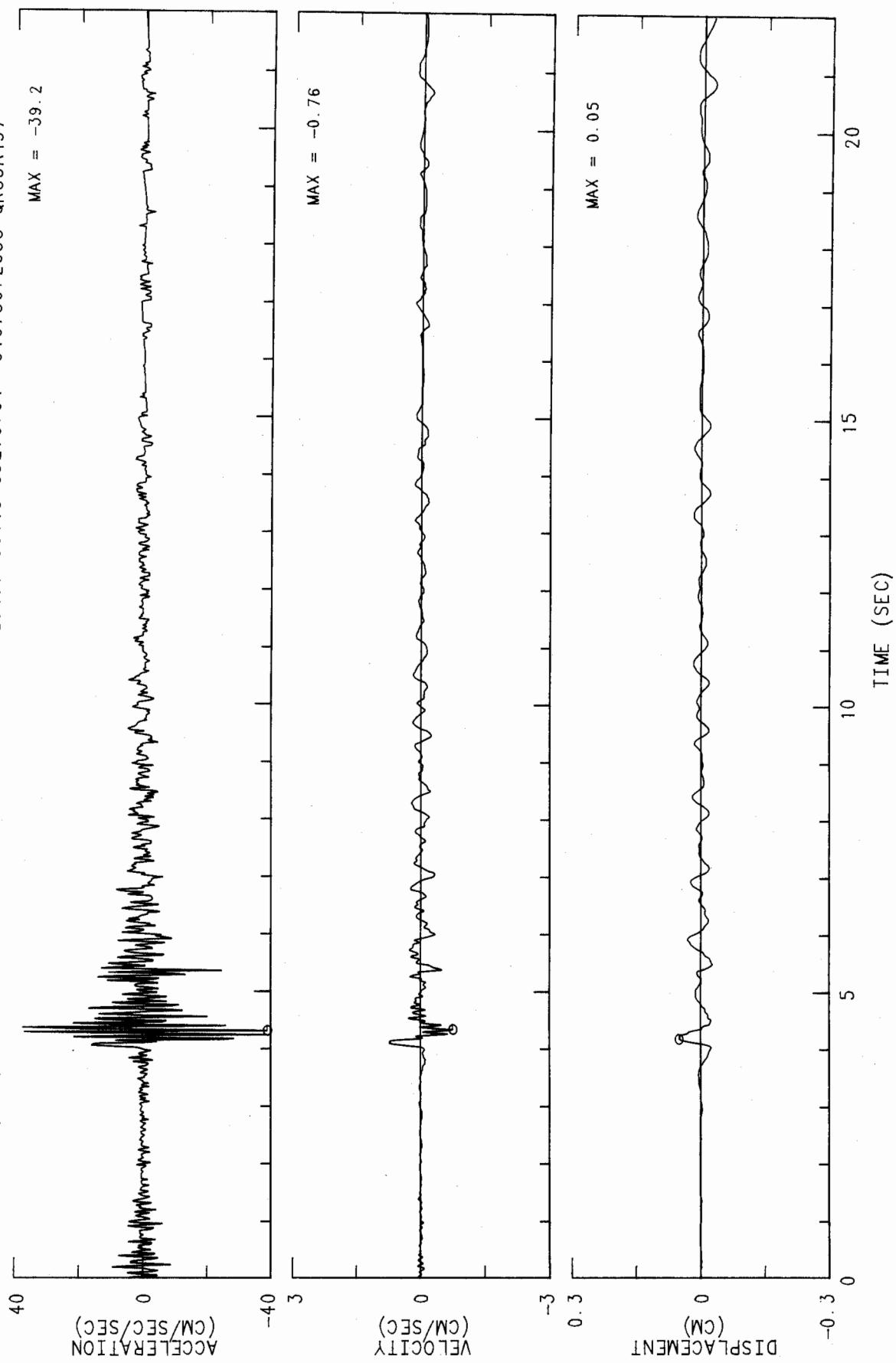
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 4 (STA CHN 17) : 90 DEG (FREE FIELD)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 Hz. 23497-C0118-85276.01 010786.2038-QR85A497



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 5 (STA CHN 18) : UP (FREE FIELD)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0118-85276.01 010786.2038-QR85A497

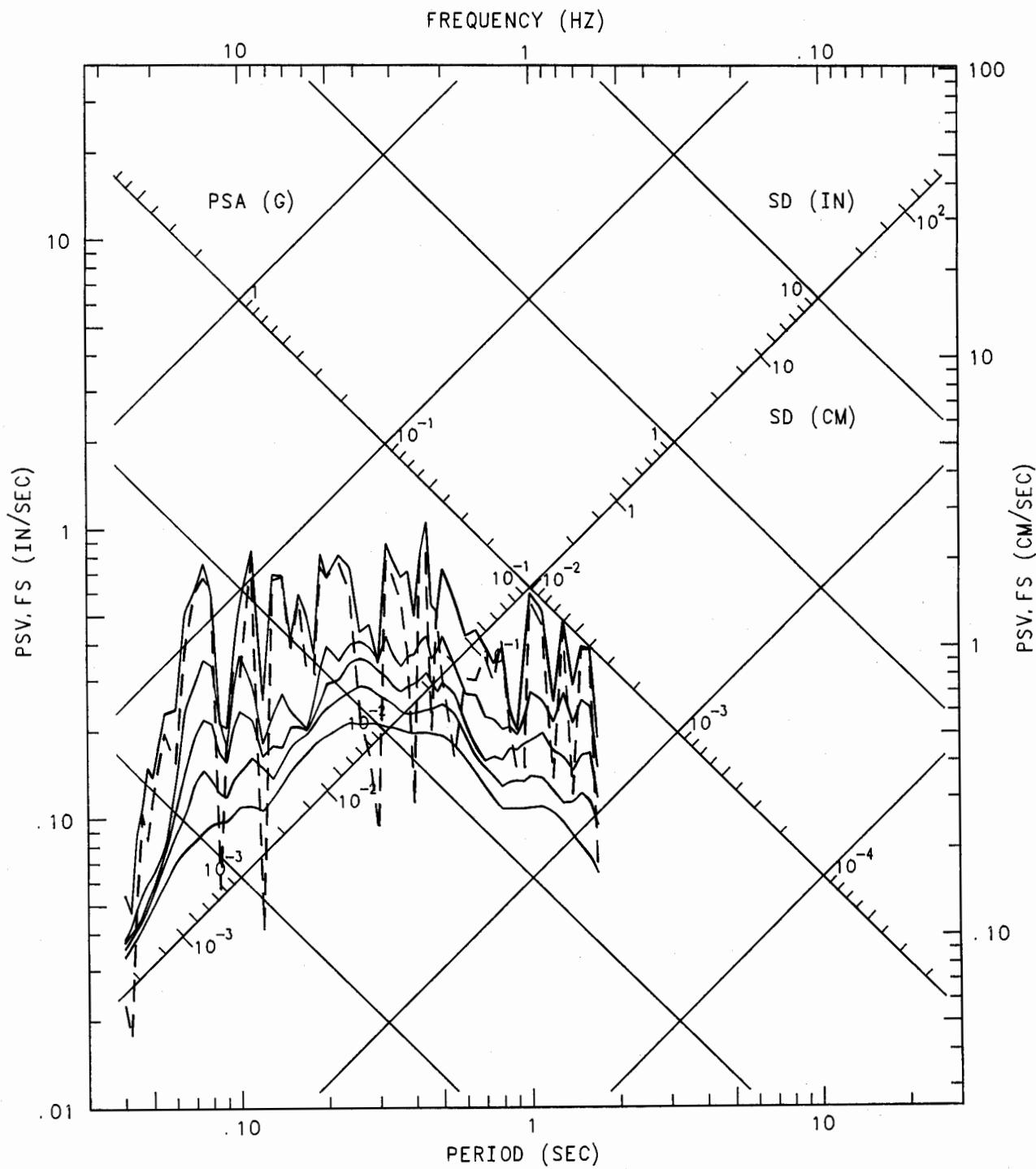


REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG. CHN 6 (STA CHN 19) : 0 DEG (FREE FIELD)
INSTRUMENT-CORRECTED AND BANDPASS-FILTERED ACCELERATION, VELOCITY AND DISPLACEMENT
FILTER BAND: 40-.80 TO 23.0-25.0 HZ. 23497-C0118-85276.01 010786.2038-QR85A497



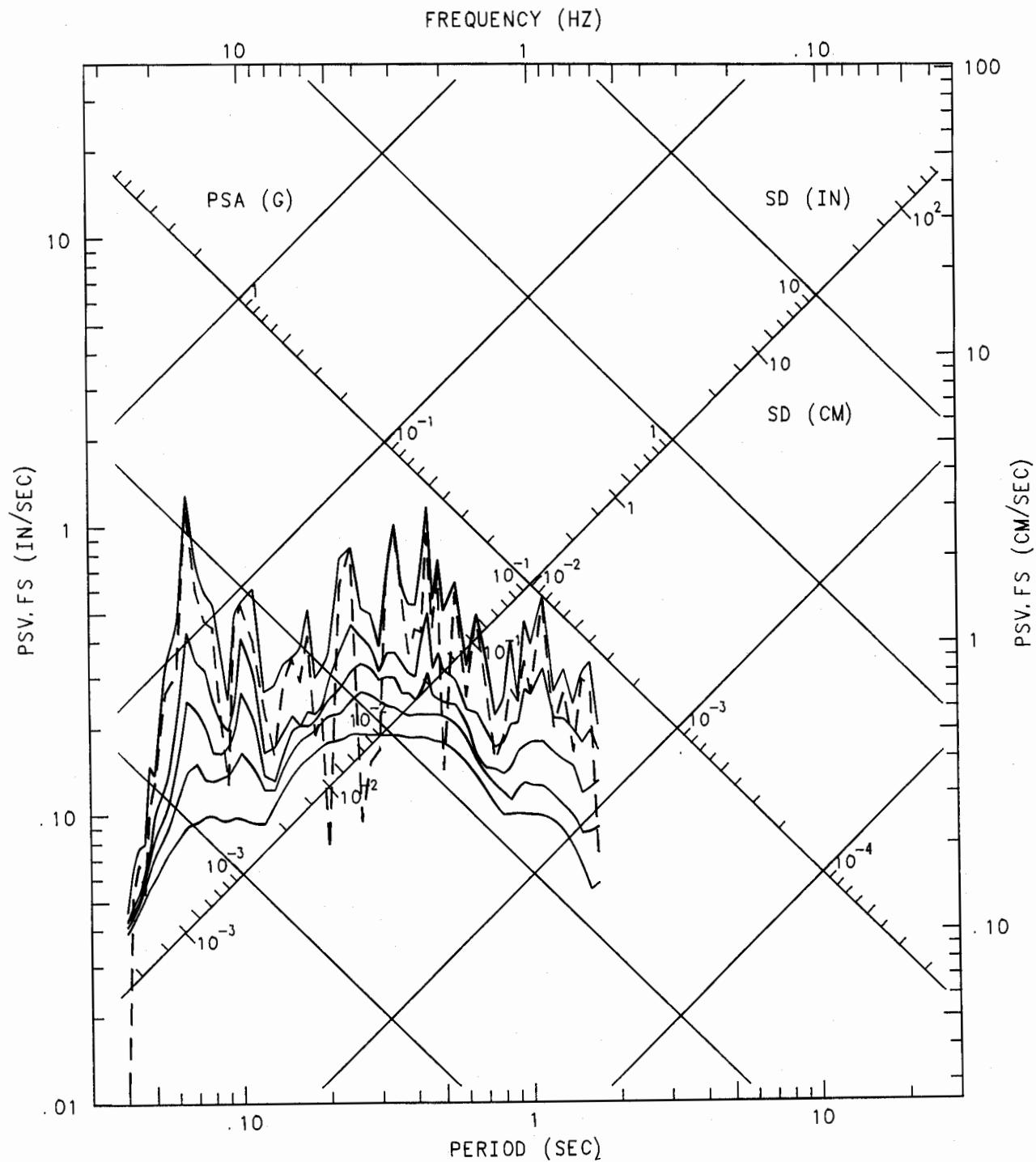
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 1: UP (FOUNDATION, AT SOUTH WALL)
ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



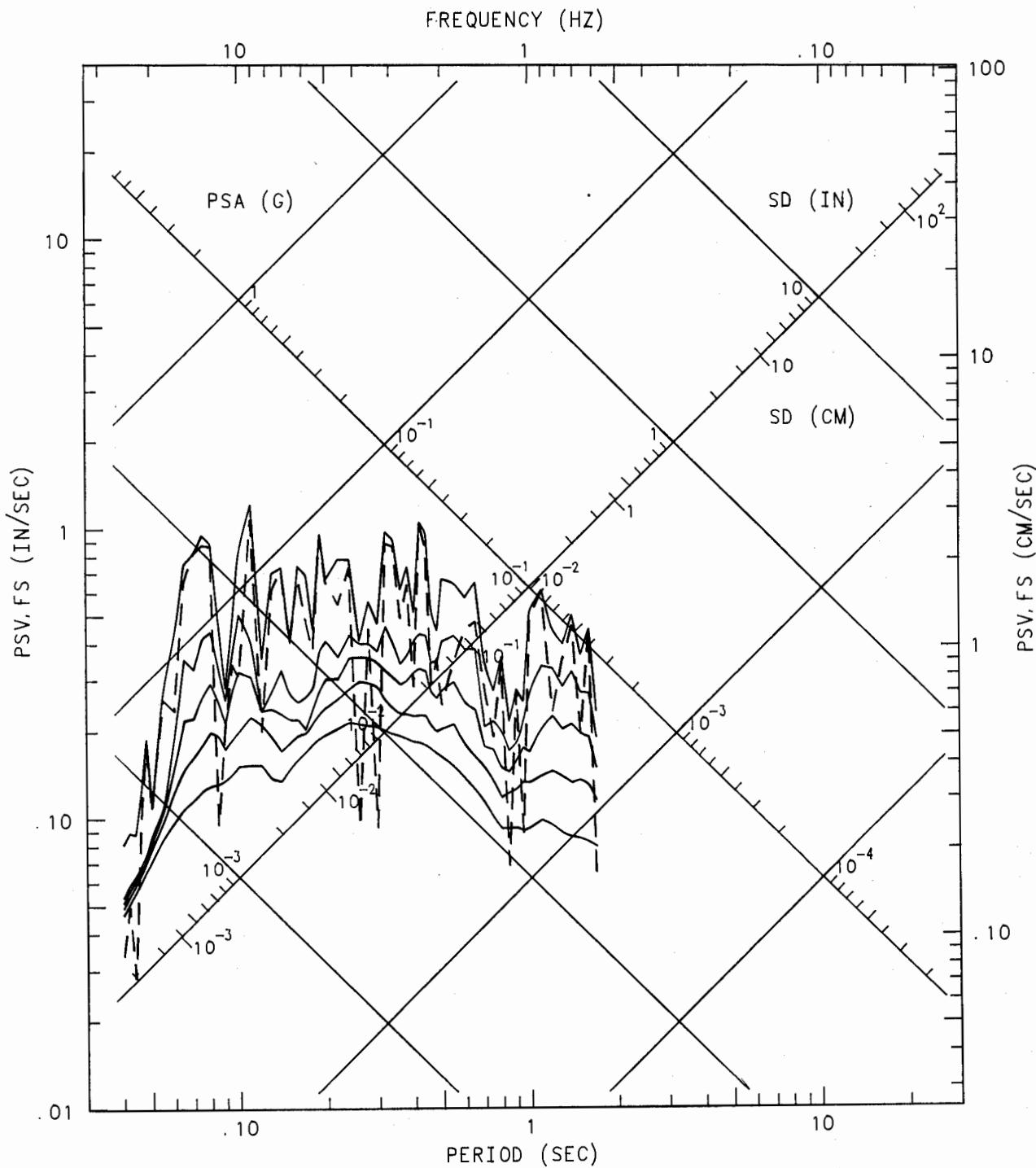
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 2: UP (FOUNDATION, AT NORTH WALL)
ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
 RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
 CHN 3: UP (BASEMENT, AT SOUTH WALL)
 ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
 23497-C0273-85276.01 022886.1744-QR85A497C1

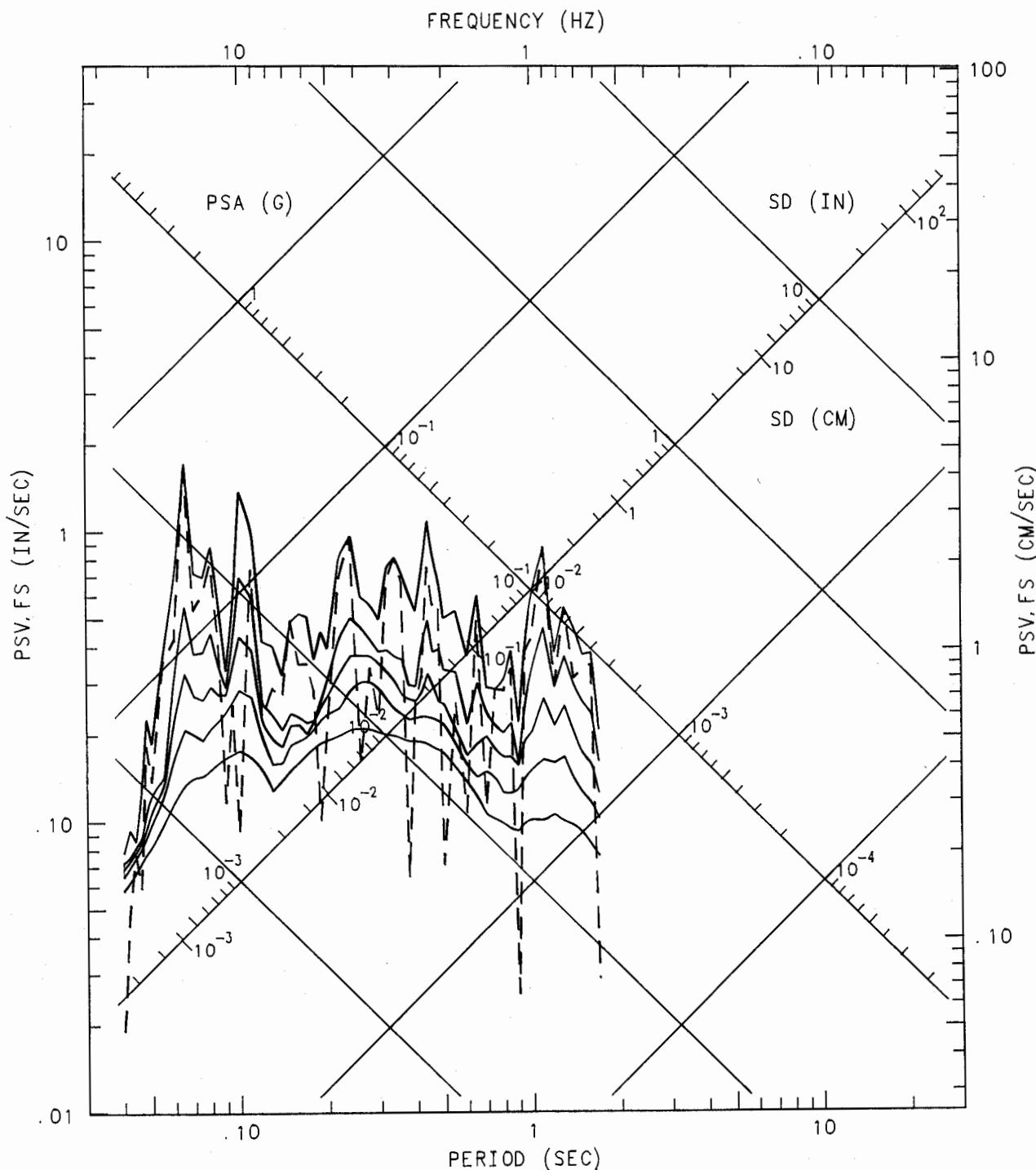
— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
 DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 4: UP (BASEMENT, AT NORTH WALL)

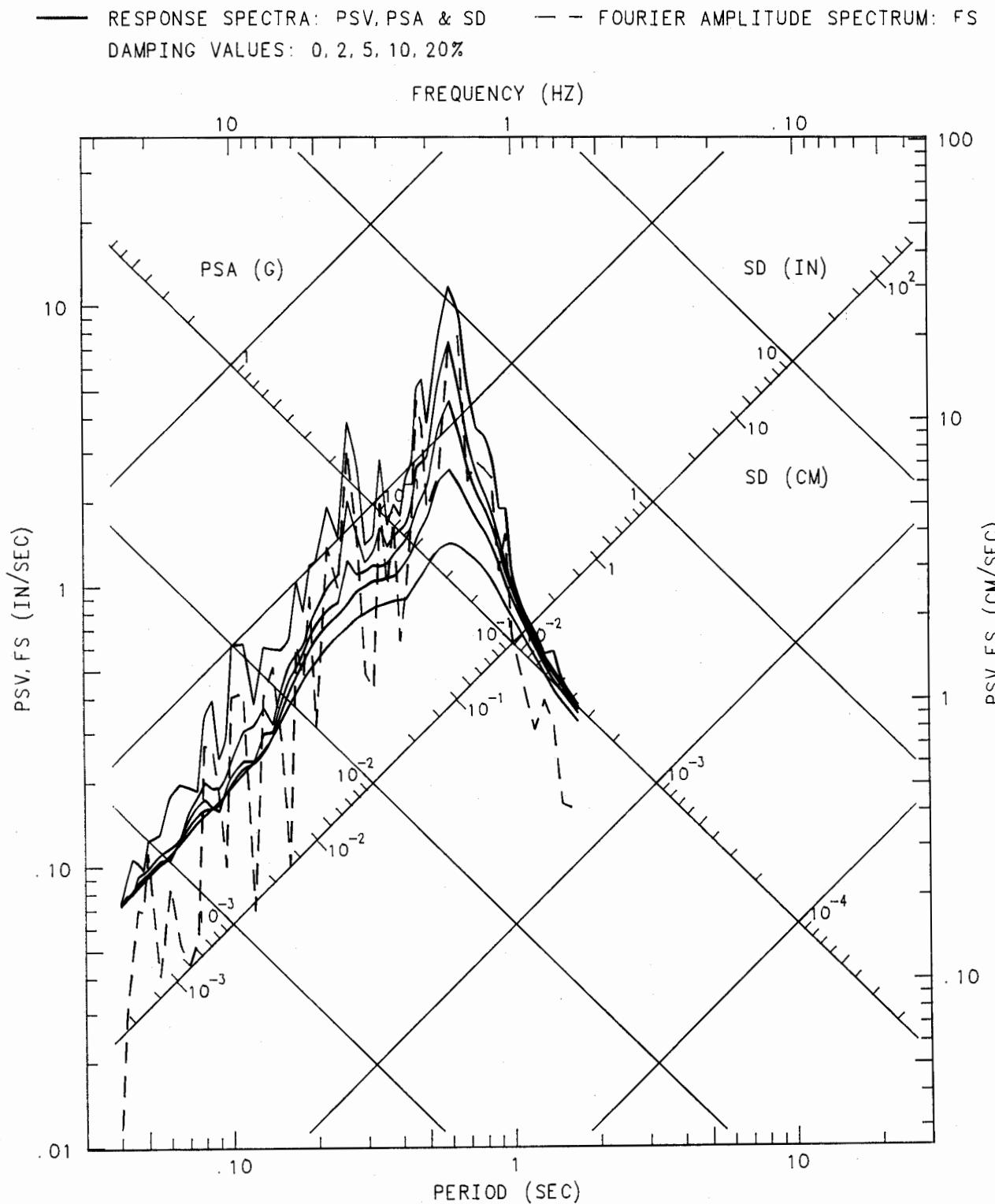
ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 5: 0 DEG (ROOF, AT WEST WALL)

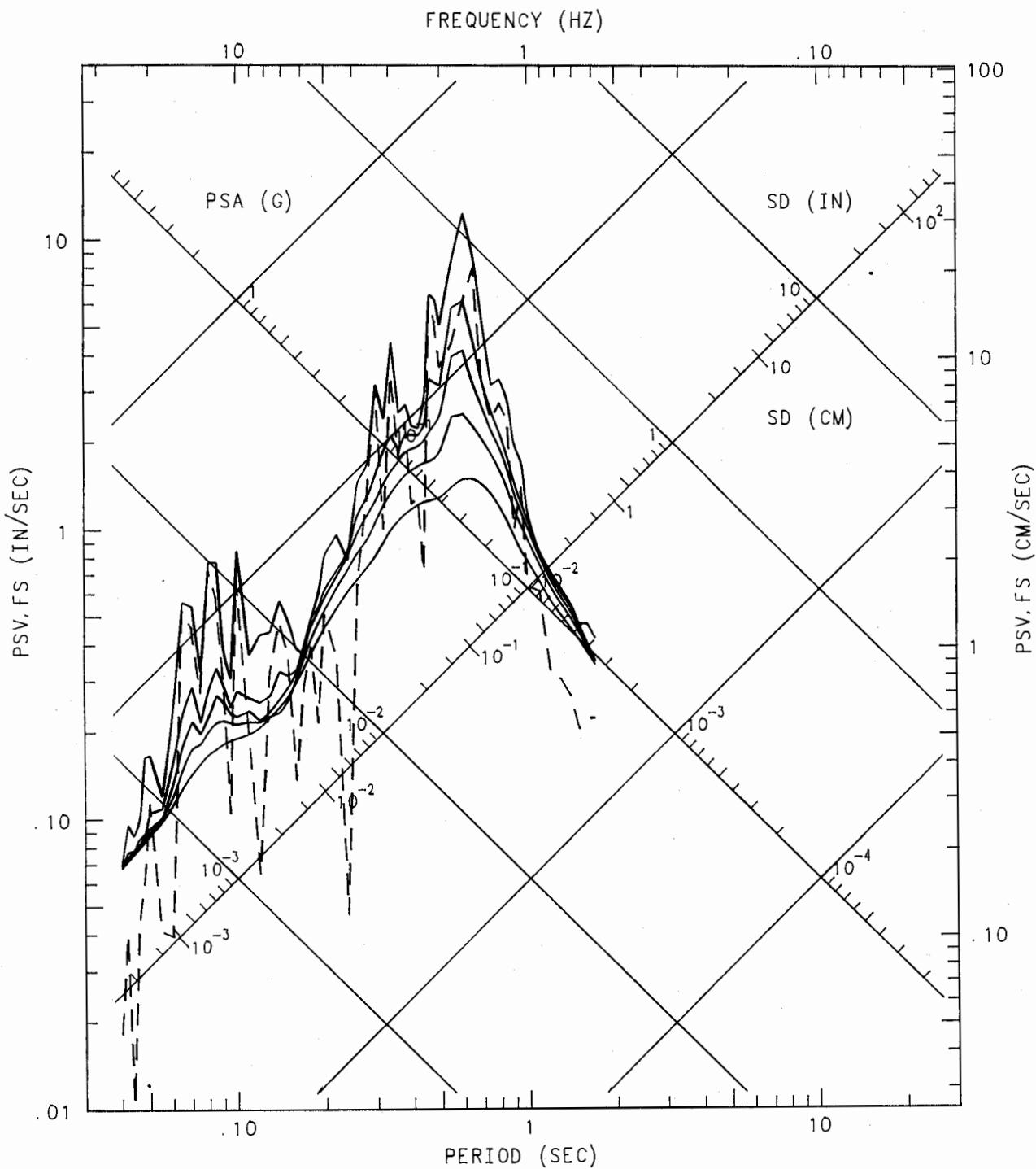
ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886.1744-QR85A497C1



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 6: 0 DEG (ROOF, AT CENTER)

ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 HZ.
23497-C0273-85276.01 022886.1744-QR85A497C1

• RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT

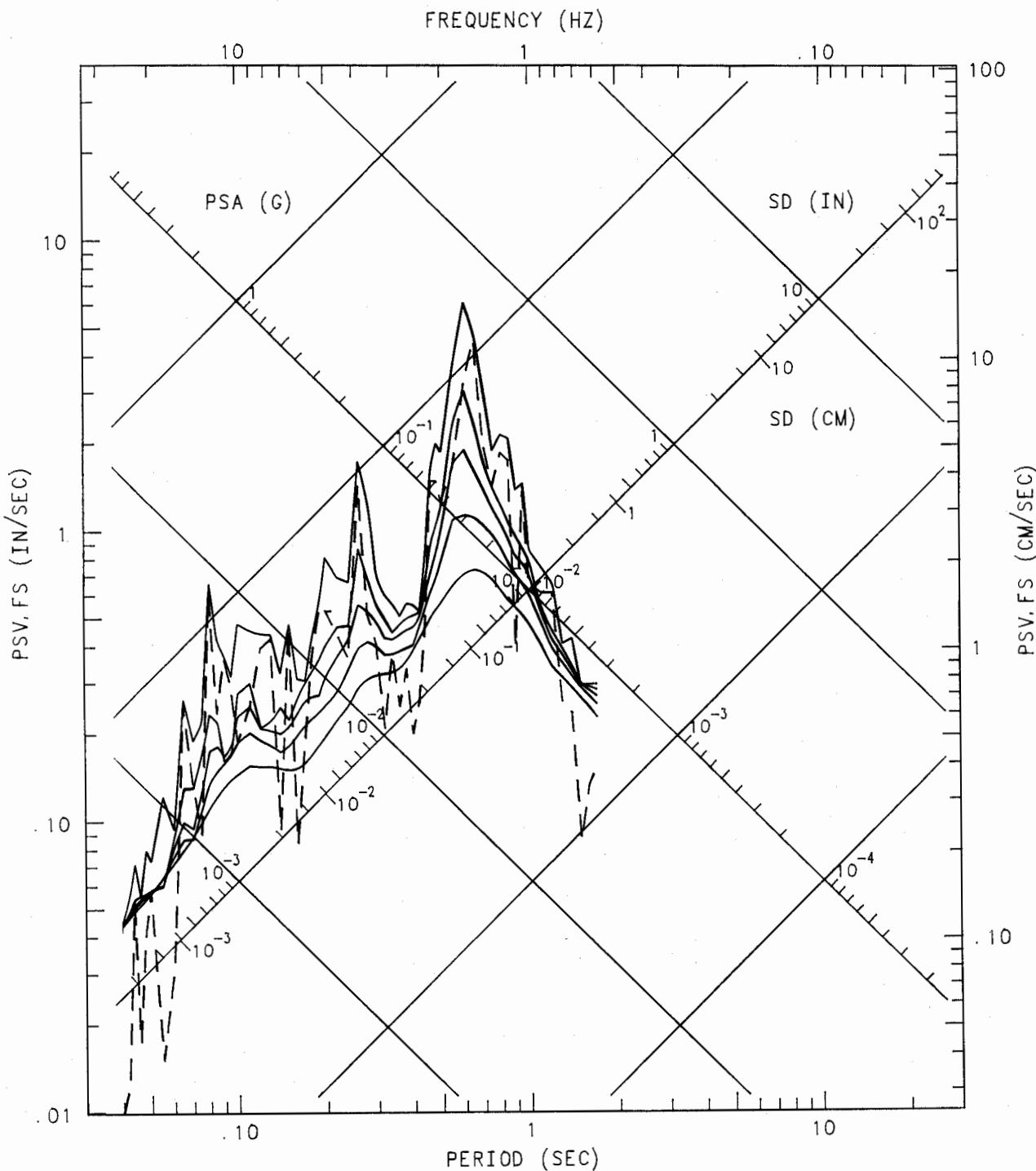
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.

CHN 7: 0 DEG (2ND FLOOR, AT CENTER)

ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 HZ.

23497-C0273-85276.01 022886.1744-QR85A497C1

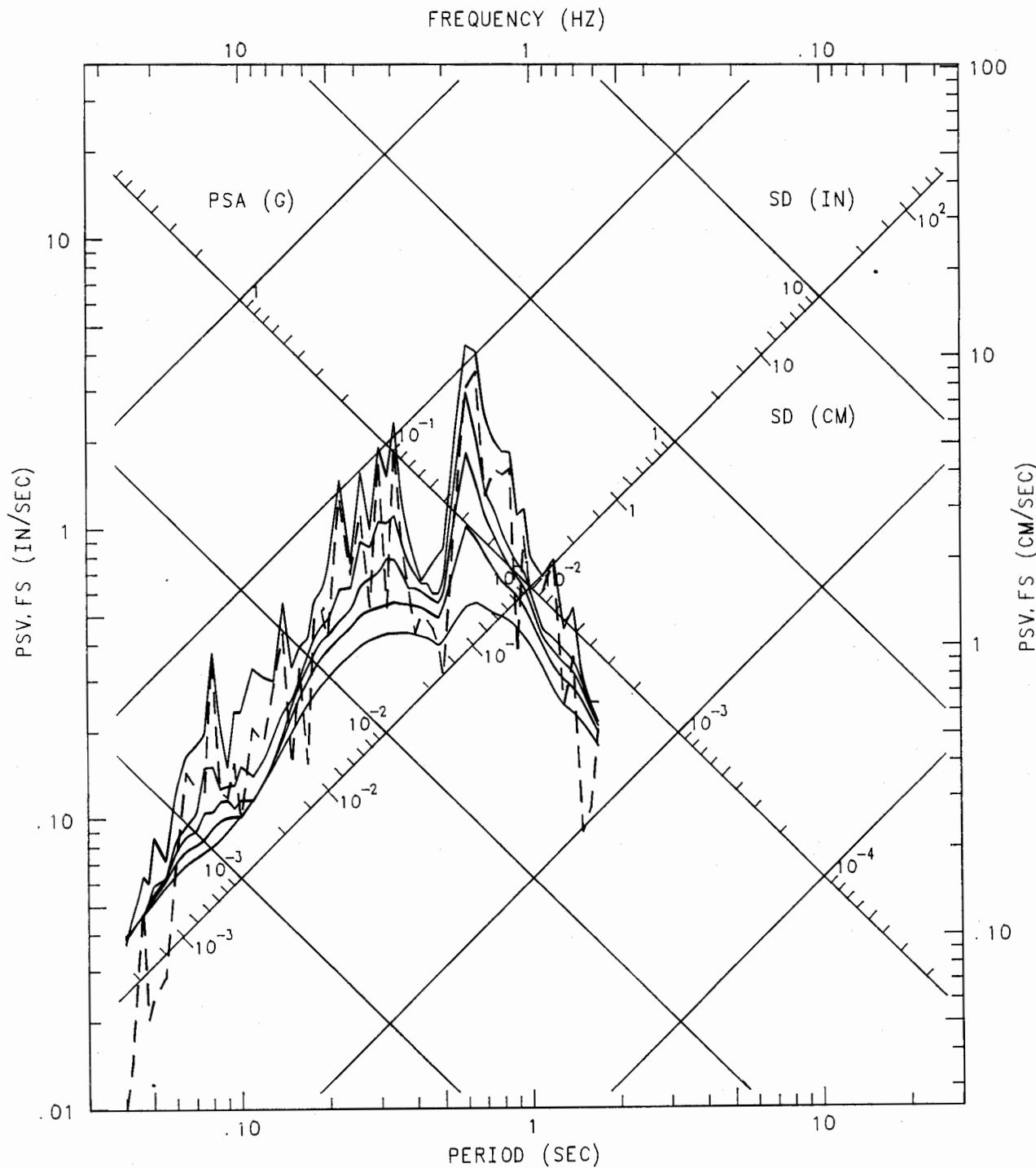
— RESPONSE SPECTRA: PSV, PSA & SD - - FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 8: 0 DEG (BASEMENT, AT WEST WALL)

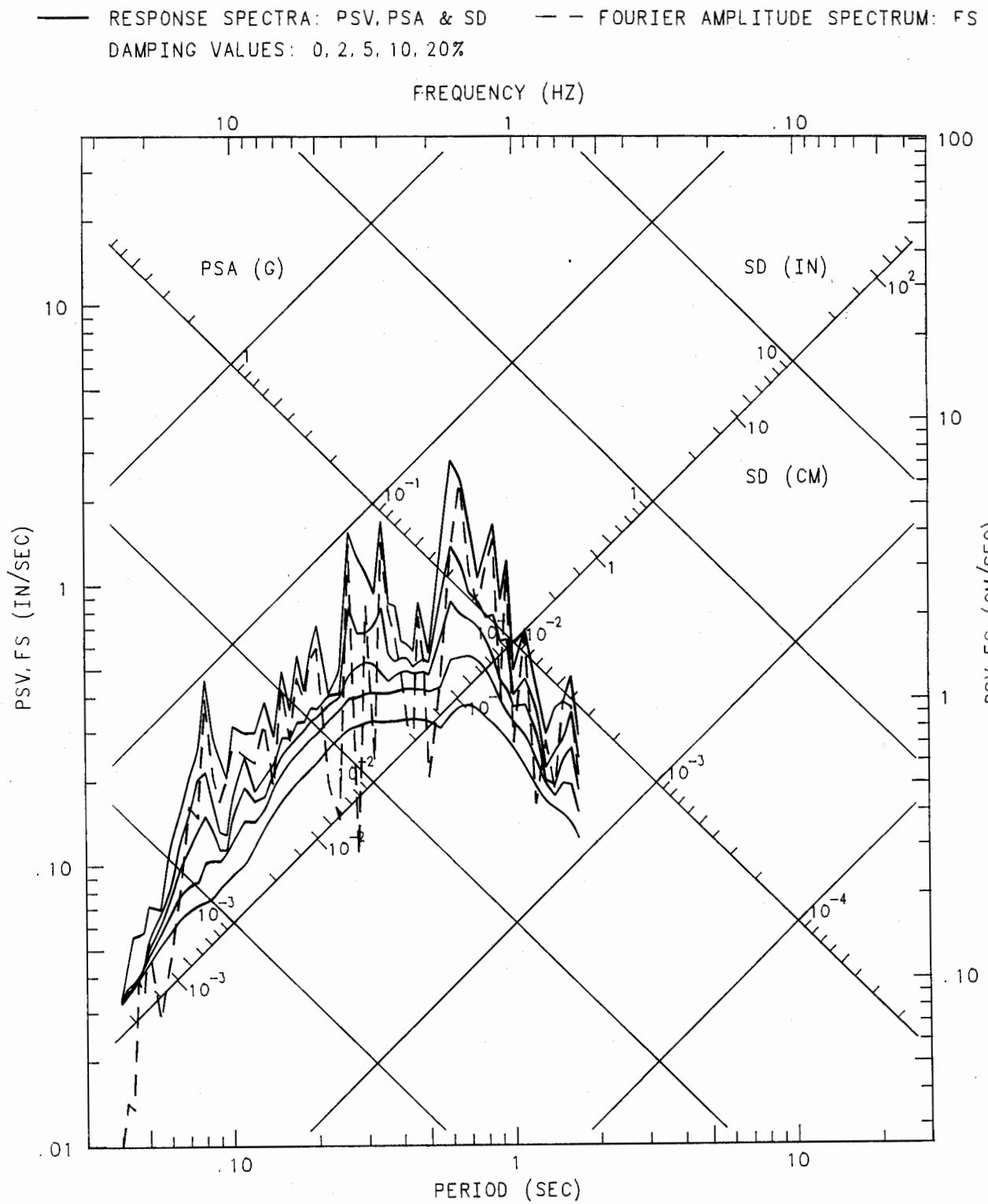
ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



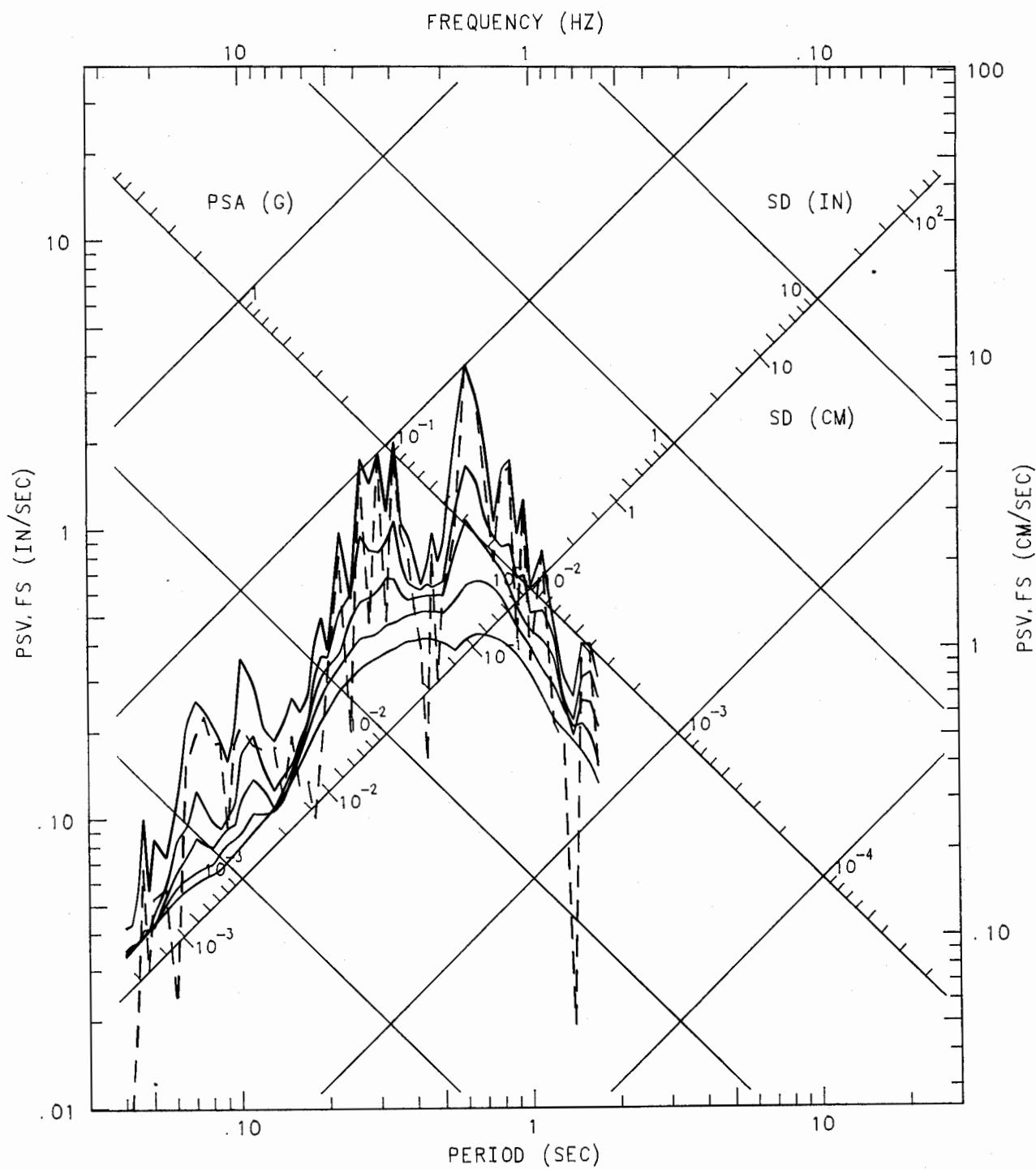
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 9: 0 DEG (BASEMENT, AT CENTER)

ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886.1744-QR85A497C1



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 10: 0 DEG (BASEMENT, AT EAST WALL)
ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0273-85276.01 022886, 1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT

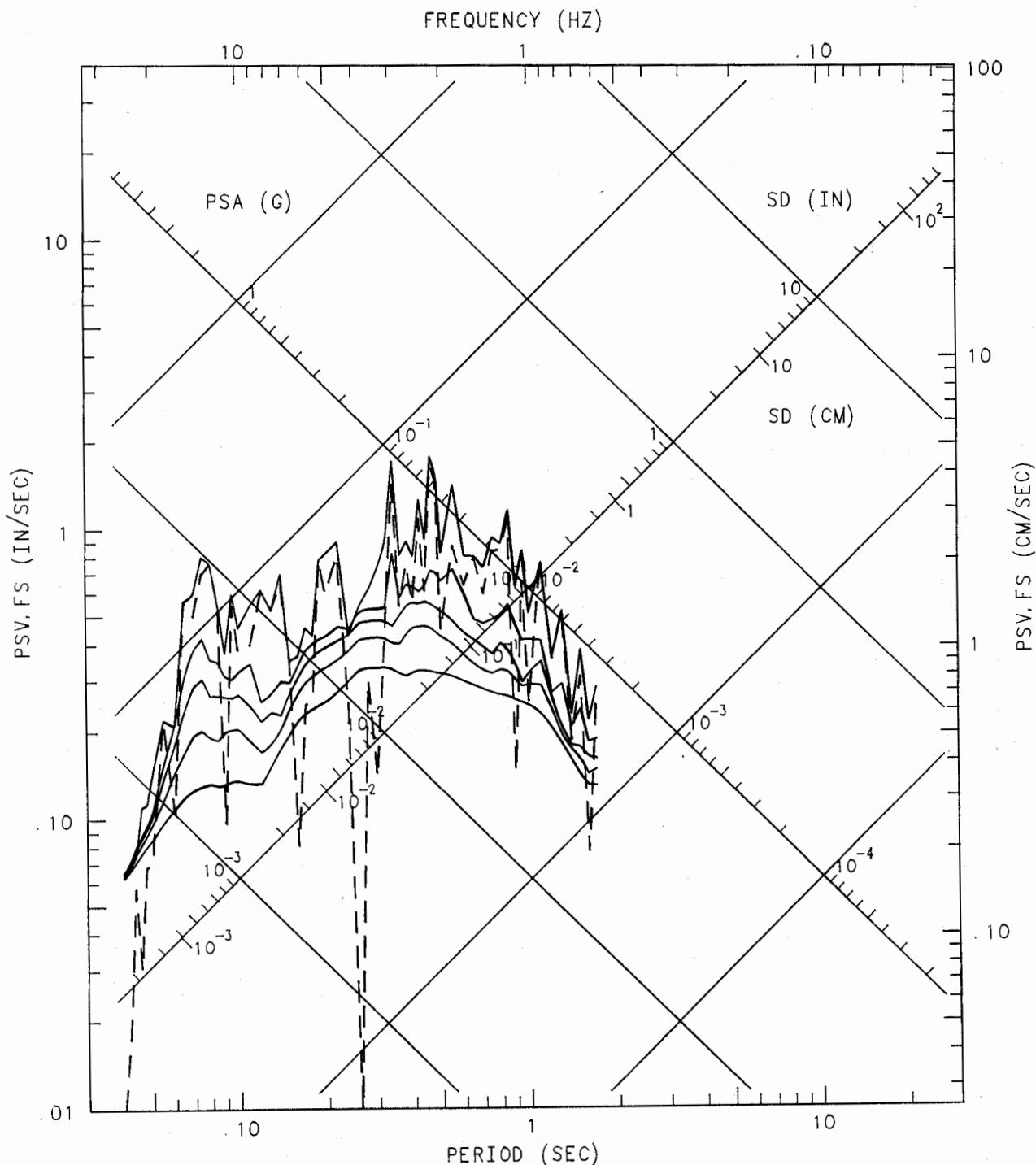
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.

CHN 11: 0 DEG (FOUNDATION, AT WEST WALL)

ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 HZ.

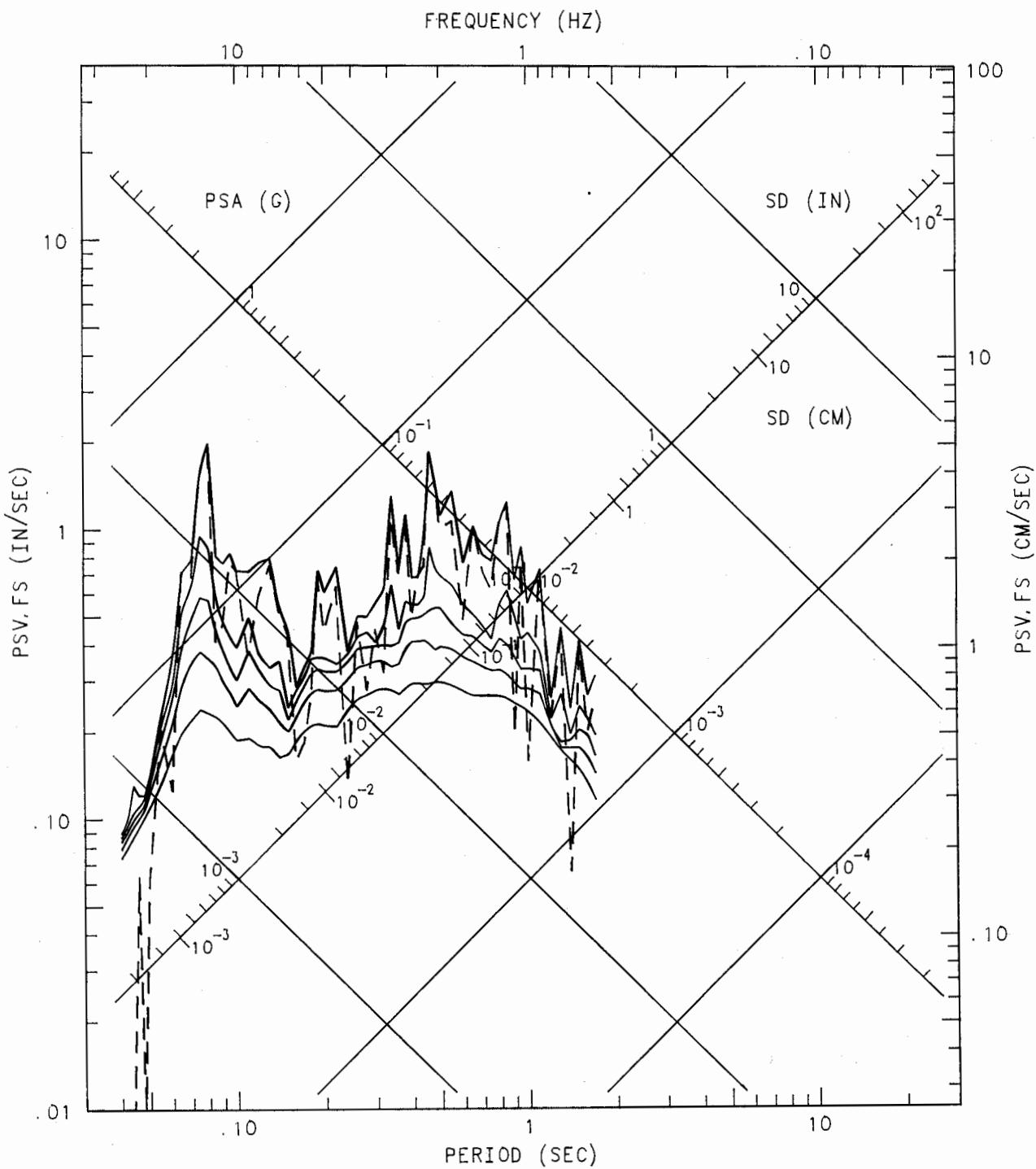
23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



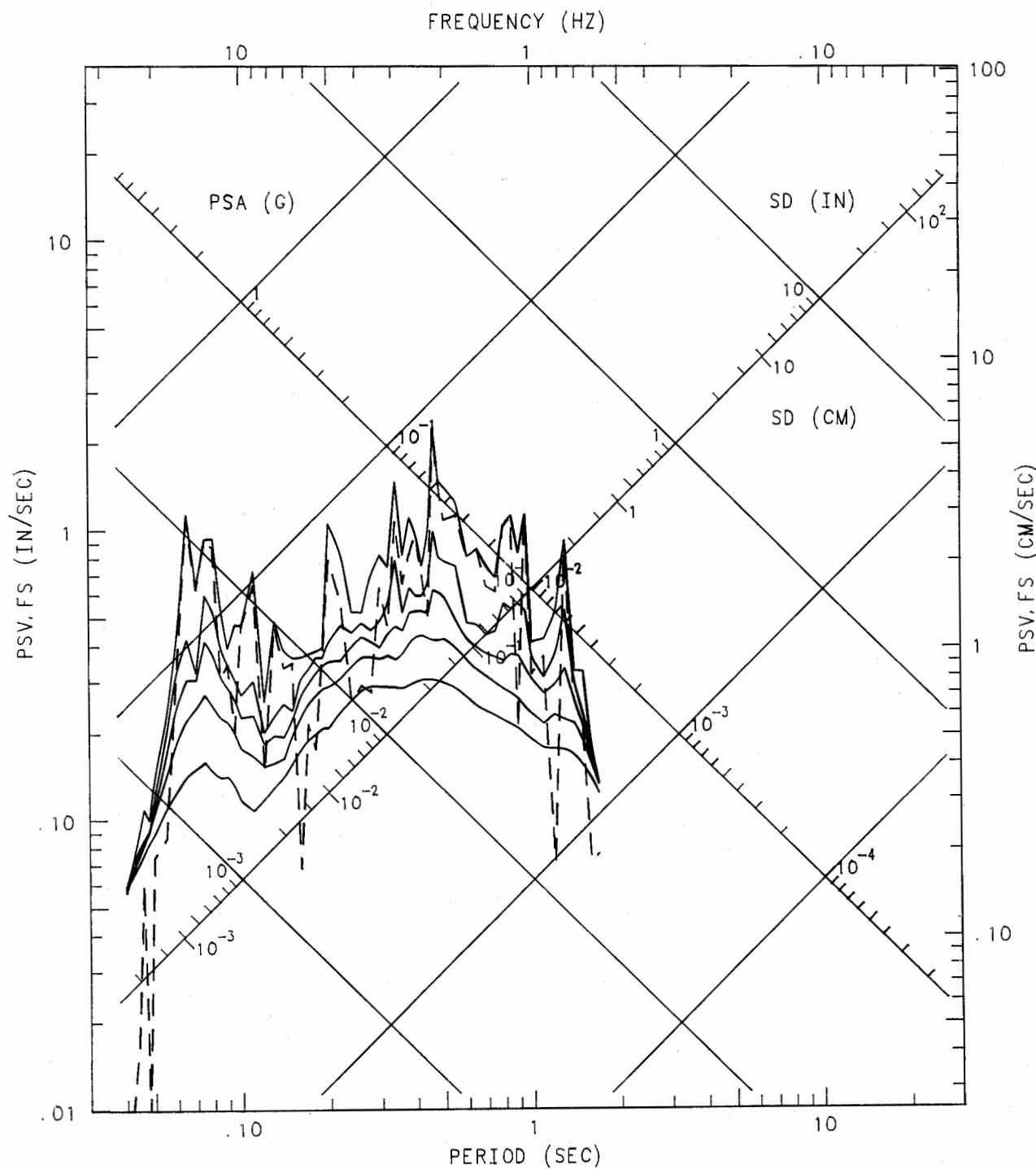
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
 RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
 CHN 12: 0 DEG (FOUNDATION, AT CENTER)
 ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 HZ.
 23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
 DAMPING VALUES: 0, 2, 5, 10, 20%



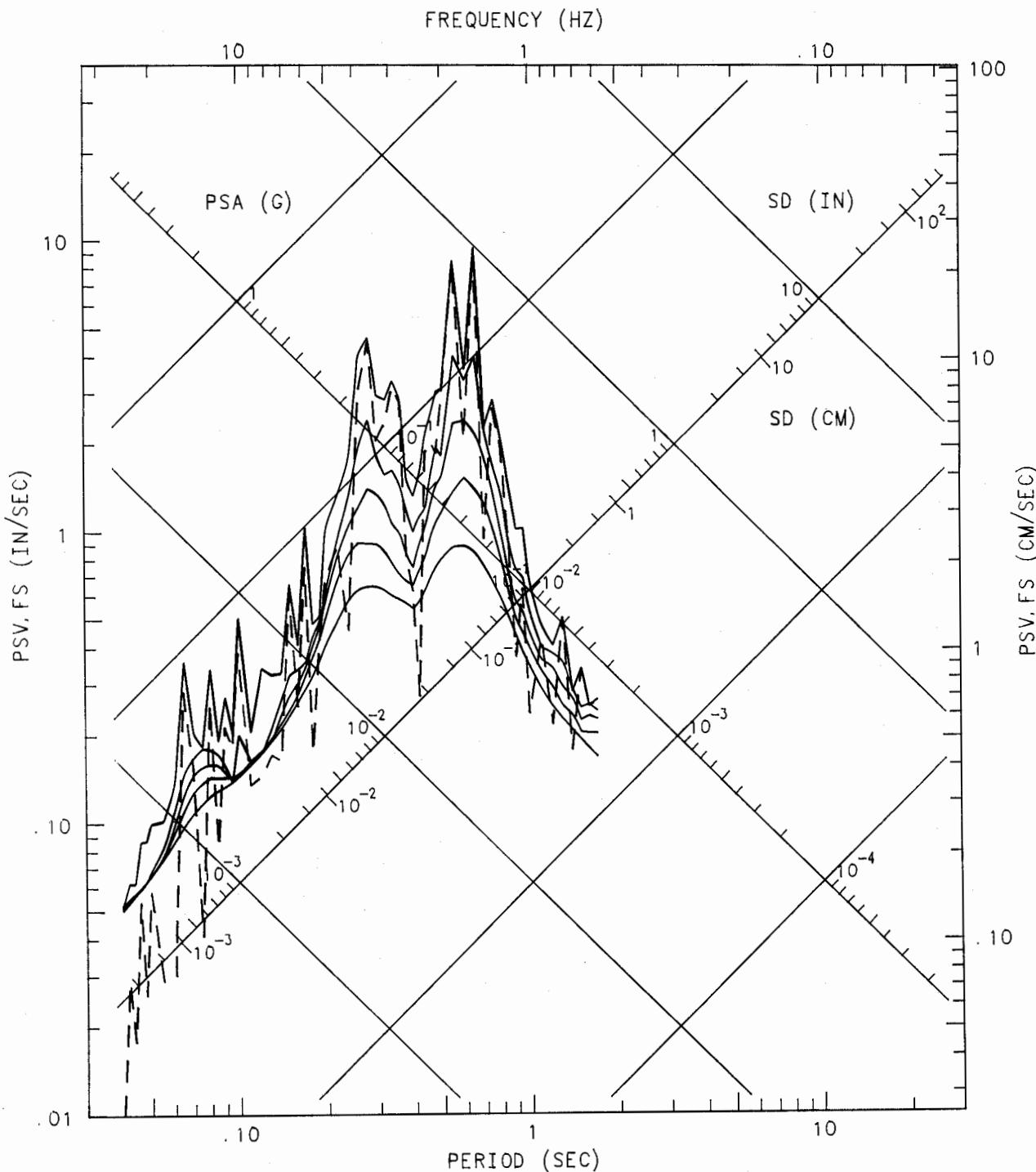
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
 RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
 CHN 13: 0 DEG (FOUNDATION, AT EAST WALL)
 ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 HZ.
 23497-C0273-85276.01 022886.1744-QR85A497C1

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
 DAMPING VALUES: 0, 2, 5, 10, 20%



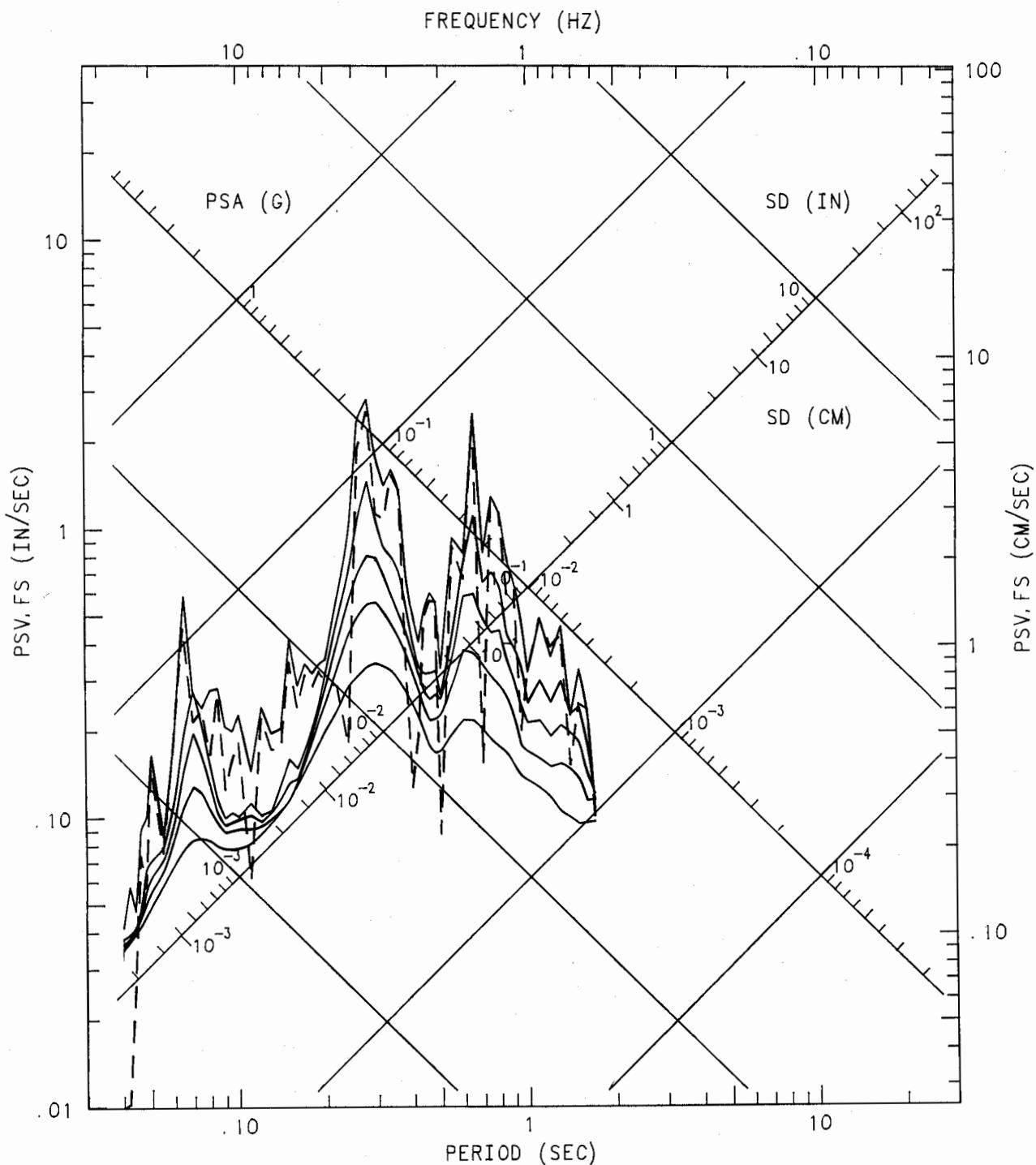
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 1 (STA CHN 14): 90 DEG (ROOF, AT CENTER)
ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0118-85276.01 022886.1542-QR85A497

— RESPONSE SPECTRA: PSV, PSA & SD — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%

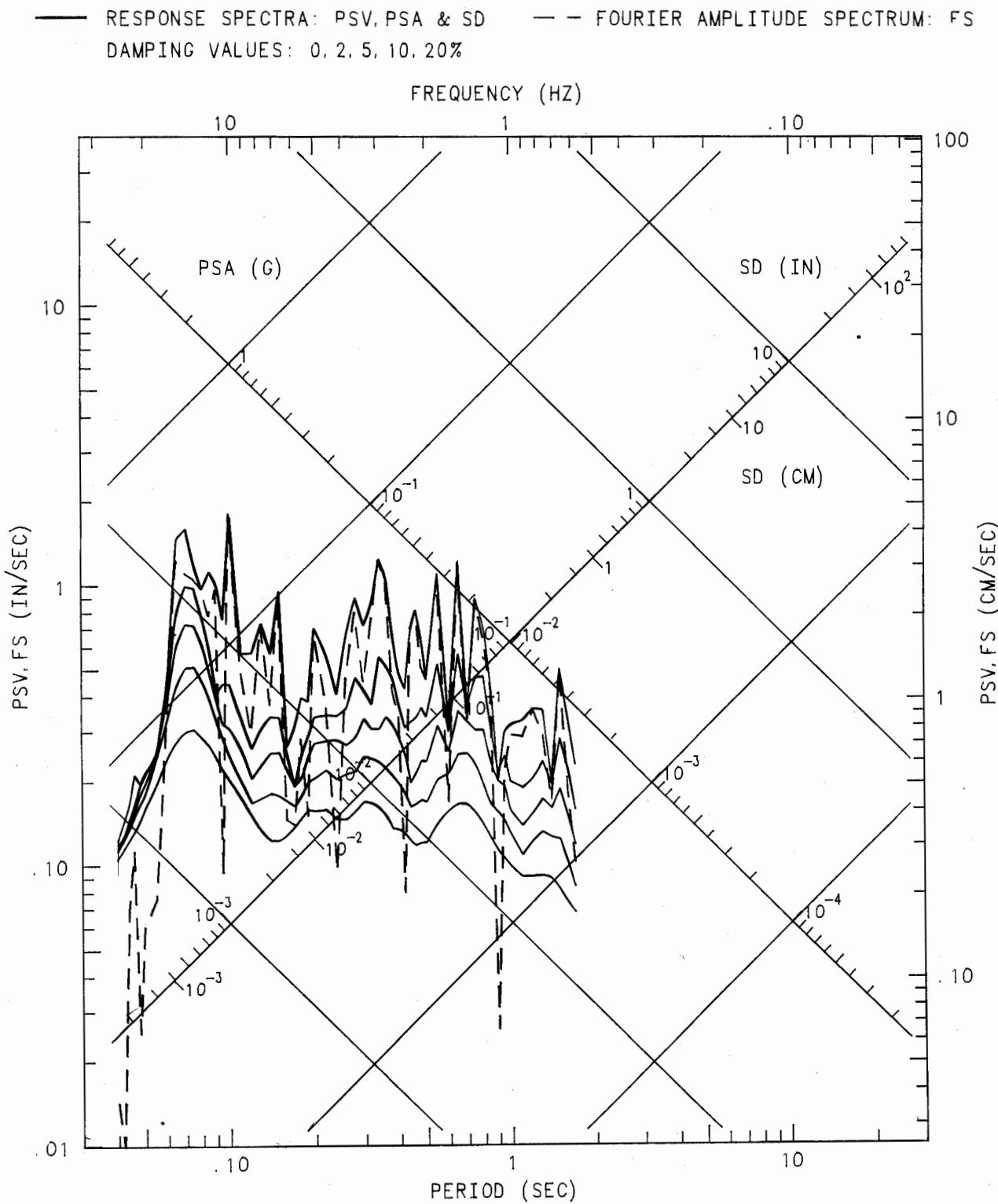


REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 2 (STA CHN 15): 90 DEG (BASEMENT, AT CENTER)
ACCELEROGRAF BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0118-85276.01 022886.1542-QR85A497

— RESPONSE SPECTRA: PSV, PSA & SD — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



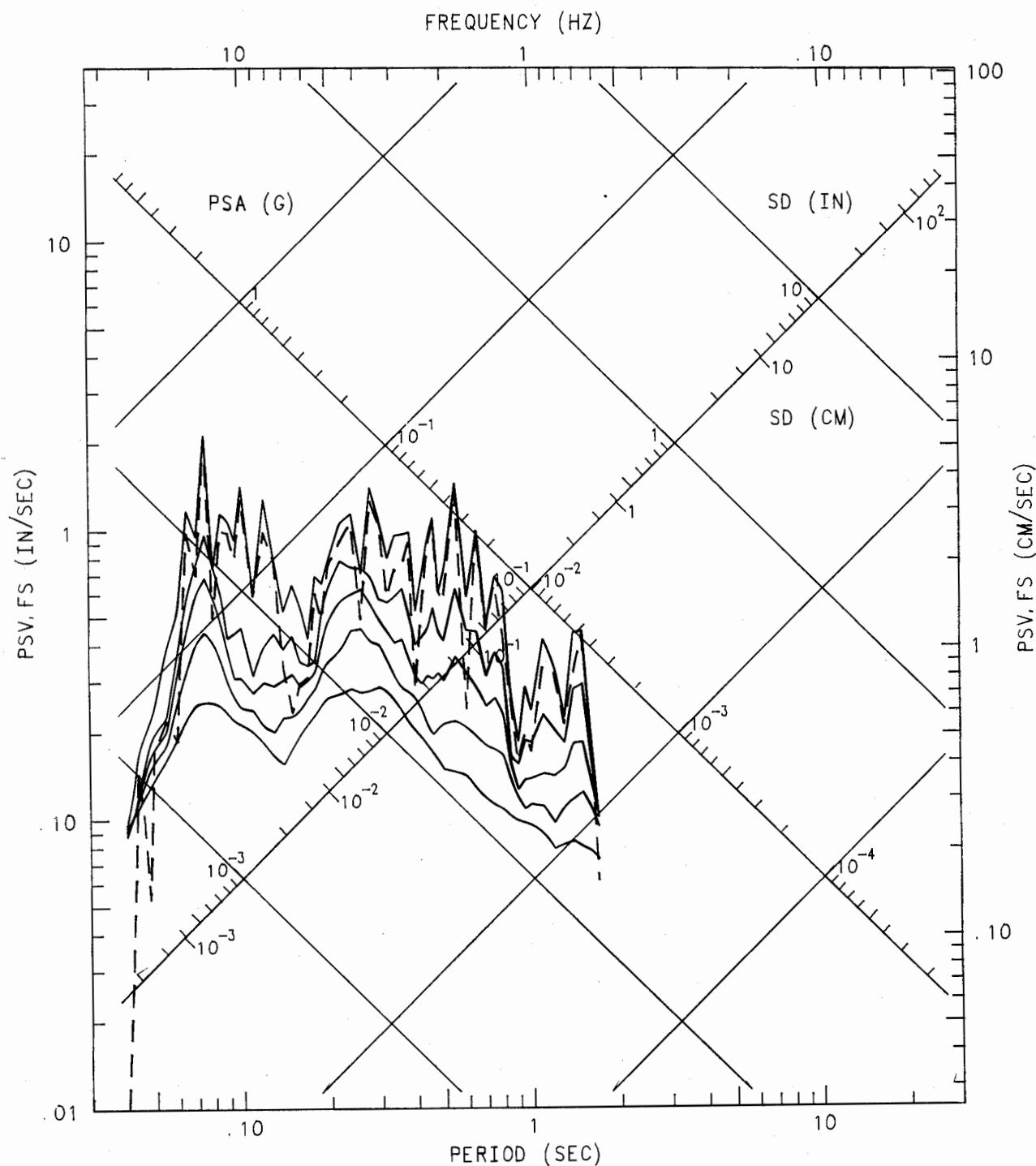
REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
 RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
 CHN 3 (STA CHN 16): 90 DEG (FOUNDATION, AT CENTER)
 ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
 23497-C0118-85276.01 022886.1542-QR85A497



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 4 (STA CHN 17): 90 DEG (FREE FIELD)

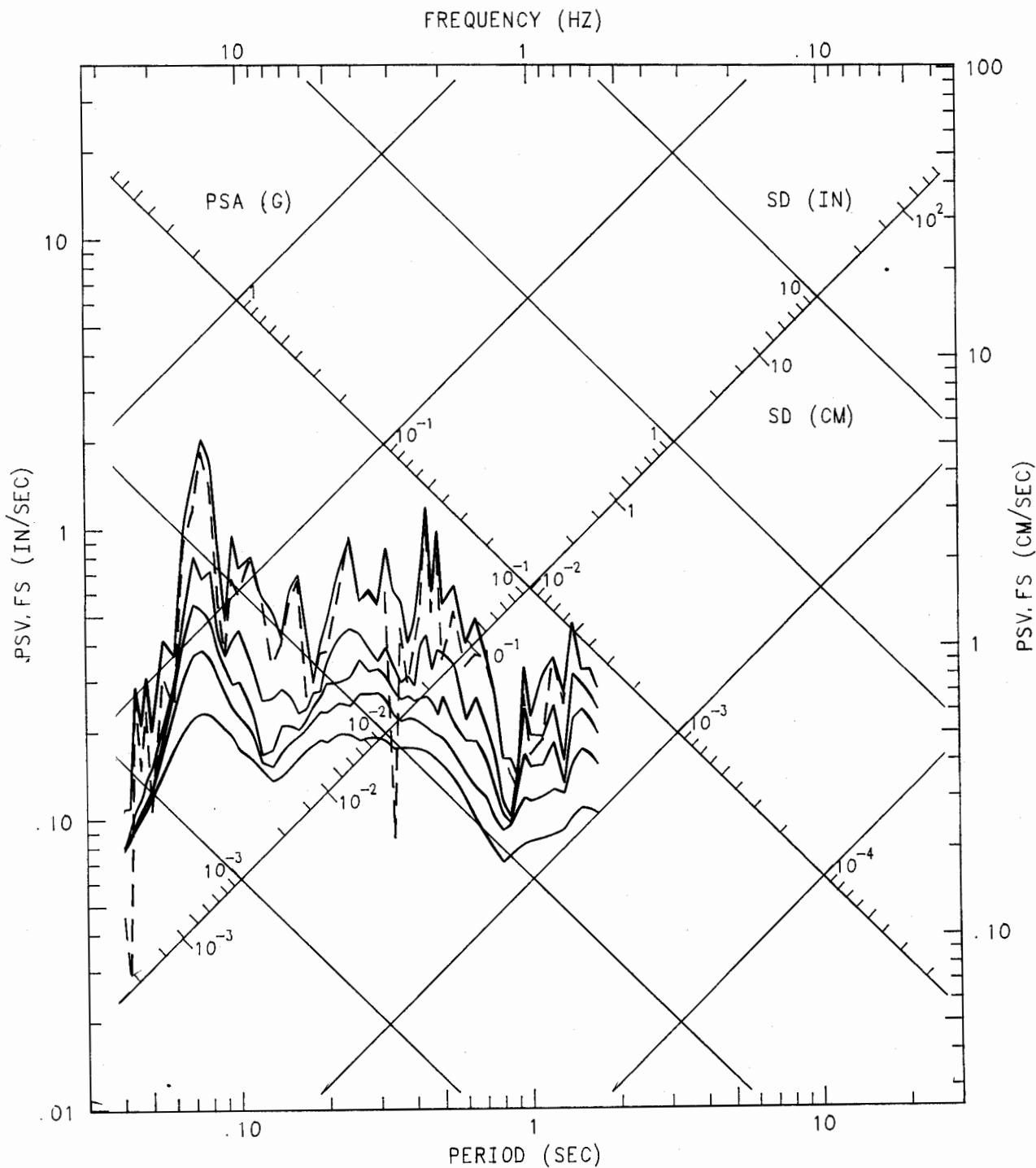
ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 HZ.
23497-C0118-85276.01 022886.1542-QR85A497

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
 RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
 CHN 5 (STA CHN 18) : UP (FREE FIELD)
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 23497-C0118-85276.01 022886.1542-QR85A497

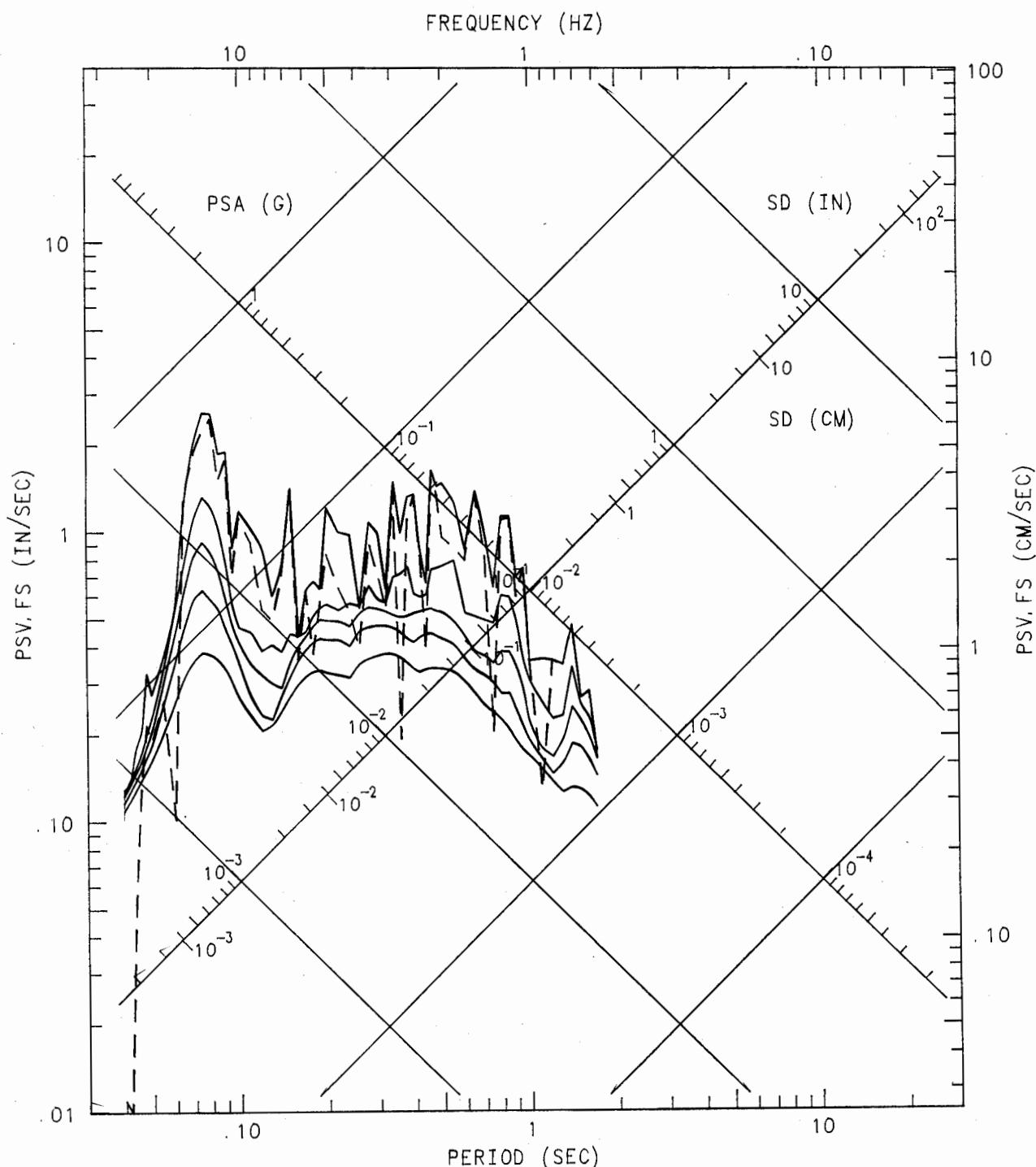
— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
 DAMPING VALUES: 0, 2, 5, 10, 20%



REDLANDS EARTHQUAKE OCTOBER 2, 1985 16:44 PDT
RANCHO CUCAMONGA - LAW & JUSTICE BLDG.
CHN 6 (STA CHN 19): 0 DEG (FREE FIELD)

ACCELEROMGRAM BANDPASS-FILTERED WITH RAMPS AT .40-.80 TO 23.0-25.0 Hz.
23497-C0118-85276.01 022886.1542-QR85A497

— RESPONSE SPECTRA: PSV, PSA & SD — — FOURIER AMPLITUDE SPECTRUM: FS
DAMPING VALUES: 0, 2, 5, 10, 20%



LIST OF CSMIP REPORTS AND DATA TAPES

California Department of Conservation
 Division of Mines and Geology
 Office of Strong Motion Studies
 California Strong Motion Instrumentation Program (CSMIP)

AVAILABLE REPORTS:

Title	Number
I. Earthquake Data Reports:	
Selected Accelerograms from the Redlands, California Earthquake of October 2, 1985 (Including first records from a Base-Isolated Building)	OSMS 85-02
CSMIP Strong-Motion Records from the Bishop, California Earthquake of 23 November 1984	OSMS 84-12
CDMG Strong-Motion Records from the Morgan Hill, California Earthquake of 24 April 1984	OSMS 84-7
Preliminary Summary of CDMG Strong-Motion Records from the 2 May 1983 Coalinga, California, Earthquake	OSMS 83-5.2
Strong-Motion Records from the Mammoth Lakes, California Earthquake of 6 January 1983	OSMS 83-1.1
Strong-Motion Records Recovered from the Mammoth Lakes, California, Earthquake of 30 September 1981	OSMS 81-10.1
Strong-Motion Records Recovered from the Westmorland, California, Earthquake of 25 April 1981	OSMS 81-5.1
Strong-Motion Records Recovered from the Trinidad-Offshore, California, Earthquake of 25 April 1981	OSMS 80-11.1
Strong-Motion Records from the Livermore Earthquakes of 24 and 26 January 1980	PR 28
Strong-Motion Records from the Mammoth Lakes Earthquakes of May 1980	PR 27
Compilation of Strong-Motion Records and Preliminary Data from the Imperial Valley Earthquake of 15 October 1979	PR 26
Compilation of Strong-Motion Records from the Coyote Lake Earthquake of 6 August 1979	PR 25
Compilation of Strong-Motion Records Recovered from the Bishop, California, Earthquake of 4 October 1978	OSMS 78-7.1

<u>Title</u>	<u>Number</u>
Compilation of Strong-Motion Records Recovered from the Santa Barbara Earthquake of 13 August 1978	PR 22
Catalog of Strong Motion Accelerograph Records Recovered by Office of Strong Motion Studies During 1982	SR 154A
Catalog of Strong Motion Accelerograph Records Recovered by Office of Strong Motion Studies before January 1, 1982	SR 154
II. Processed Data Reports:	
Processed Data From Strong-Motion Records of the Morgan Hill Earthquake of 24 April 1984: Part I Ground-Response Records (in preparation)	OSMS 85-04
Processed Data From Strong-Motion Records of the Morgan Hill Earthquake of 24 April 1984: Part II Structural-Response Records	OSMS 85-05
Processed Data from the Strong-Motion Records of the Imperial Valley Earthquake of 15 October 1979. Final Results	SP 65
Processed Data from the San Juan Bautista 101/156 Separation Bridge and the San Juan Bautista Freefield Records from the Coyote Lake Earthquake 6 August 1979	SP 64
Processed Data from the Gilroy Array and Coyote Creek Records, Coyote Lake, California, Earthquake 6 August 1979 (Note: Does not include San Juan Bautista records)	PR 24
Processed Data from the Strong-Motion Records of the Santa Barbara Earthquake of 13 August 1978. Final Results (in three volumes)	SR 144
III. Other Reports:	
Standard Tape Format of CSMIP Strong-Motion Data Tapes	OSMS 85-03
California Strong-Motion Instrumentation Program: Construction and Installation Notes for a Ground-Response Station.	OSMS 85-01

There is a nominal charge for these reports.

AVAILABLE STRONG-MOTION DATA TAPES:

Tape Name	Description
SANTBARB78	Santa Barbara earthquake of 13 August 1978; Vol. 1, 2, and 3 data.
IMPERIAL79	Imperial Valley earthquake of 15 October 1979 (County Services Bldg. and other CSMIP stations); Vol. 1, 2, and 3 data.
COYOTE79A	Coyote Lake earthquake of 6 August 1979, Gilroy Array stations; Vol. 1, 2, and 3 data.
COYOTE79B	Coyote Lake earthquake of 6 August 1979, San Juan Bautista overpass and nearest free-field station; Vol. 1, 2, and 3 data.
COYOTE79C	Coyote Lake earthquake of 6 August 1979, Halls Valley station; Vol. 1, 2, and 3 data.
MAMMOTH80A	Mammoth Lakes earthquakes of 25 May 1980 at 09:34 and 09:49 PDT; Vol. 1, 2, and 3 data.
MAMMOTH80B	Mammoth Lakes earthquakes of 25 May 1980 at 12:45 and 13:36 PDT; Vol. 1, 2, and 3 data.
MAMMOTH80C	Mammoth Lakes earthquakes of 26 May 1980 at 11:58 PDT and 27 May 1980 at 07:51 PDT, Vol. 1, 2, and 3 data.
WESTMOR81	Westmorland earthquake of 26 April 1981; Vol. 1, 2, and 3 data.
MAMMOTH83	Mammoth Lakes earthquakes of 7 Jan 1983 at 01:38 and 03:24 GMT; Vol. 1, 2, and 3 data.
COALINGA83	Coalinga earthquake of 2 May 1983, 16:43 PDT; Vol. 2 and 3 data for 47 records.
COALINGA83-IA	Coalinga earthquake of 2 May 1983, Vol. 1 data for first 22 records.
COALINGA83-IB	Coalinga earthquake of 2 May 1983, Vol. 1 data for remaining 25 records.
COALINGA83AS	Vol. 2 and 3 data for eight aftershocks of the Coalinga 2 May 1983 earthquake. The aftershocks occurred between 8 May and 11 September 1983, and were of magnitude (ML) 4.3 - 6.0.
COALINGA83AS-I	Uncorrected acceleration data (Vol. 1) for the Coalinga aftershock records included on the tape COALINGA83AS.
RIODEL8083	Processed data from the Highway 101 Overpass at Rio Dell for the earthquakes of: 8 Nov 1980 (6.9ML Trinidad-Offshore); 16 Dec 1982 (4.4ML local earthquake) and 24 Aug 1983 (5.5ML Cape Mendicino Offshore); Vol. 1, 2, and 3 data.

<u>Tape Name</u>	<u>Description</u>
MORGANHILL84-IG	Morgan Hill earthquake of 24 April 1984; Vol. 1 data for 19 ground-response records.
MORGANHILL84-G	Morgan Hill earthquake of 24 April 1984; Vol. 2 and 3 data for 19 ground-response records.
MORGANHILL84-IS	Morgan Hill earthquake of 24 April 1984; Vol. 1 data for 9 structural-response records.
MORGANHILL84-S	Morgan Hill earthquake of 24 April 1984; Vol. 2 and 3 data for 9 structural-response records.
REDLANDS85	Redlands earthquake of 2 October 1985; Vol. 1, 2 and 3 data for the Law & Justice Building at Rancho Cucamonga.

Footnotes:

- Vol. 1 data - uncorrected accelerations.
- Vol. 2 data - instrument and baseline-corrected acceleration, velocity, and displacement.
- Vol. 3 data - Response and Fourier amplitude spectra.

The magnetic tapes are provided at cost. Included with each tape is a copy of either the processed data report (if available) or the plots of the data.